American Machinist

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BEHIND THE SCENES

in Continental Europe

Anonymous

UNDER the protection of an anonymity which obviously must be preserved, a keen student of continental trade and politics speaks his mind as in a conversation, man to man. Those most familiar with the current situation will perceive the truths contained in his remarks

THE RELATIONS between the United States and Continental Europe during the past few years—in fact almost since the League of Nations controversy at the end of the Peace Period—have been characterized by a barrage of acrimony and vituperation, reaching perhaps the culminating salvos in the recent interchanges on the much-debated tariff. I am sure that you already fully appreciate that there is much "behind the scenes" in those barrages; what is said in the course of them is not always to be taken at face value, by any means.

I cite an instance with reference to the Swiss threat to boycott the import of American automobiles. You may recall a broadside which played a prominent part in that campaign during several months last year, in which it was pointed out that now is the time for all loyal Swiss to get together and boycott American automobiles because the United States are boycotting laces and watches and cheeses and many other important Swiss products. They were careful to say nothing about our purchases of Swiss scenery and numerous other tourist transactions which mean more than their exports of cheese and watches. The origin of that pamphlet was conspicuous for its being not at all connected with Switzerland or Swiss industries. It was printed on the outskirts of a certain north Italian city where there is a rather large automobile manufacturing plant which is not making much headway against American products in the Swiss market, regardless of the fact that the given Italian automobiles have the advantage of being "driven in on the hoof," so to speak, and do not run up against the Swiss tare which, as you all know, is a term in their tariff favoring automobiles that come in "au naturel" that way, instead of packed. Since the American cars are the only ones coming into the Swiss market that are packed, that little discriminatory device is a very neat arrangement to keep us out altogether, as it was put on entirely at the instigation of our Italian rivals. In spite of that we have been making a much more rapid and successful drive in the Swiss markets than any other. It was not entirely surprising that these little pseudo-Swiss protests were made in the land of the Fascisti.

There is an appalling amount of this sort of thing, so that when you are listening to any one protest, any one blast against the American tariff, or the color of our hair, or the kind of clothes we wear, or our motion-picture films, or the kind of speedometer we have on our cars, you always have to ask yourself, "Now, what have they really got on their minds? What is there behind this

thing that they say?" In ninety-nine cases out of a hundred you will find something utterly different from that which appears on the surface. I do not mean to say that they are all dishonest or all falsifiers, but there is a surprising amount of levity and liberty being taken with actual face facts these days.

French Politics

As regards France, we must bear in mind, in the first place, that the complexities of the French political situation have a great deal to do with what the politicians say and do. Remember that since 1924 France has had twelve governments. That is an average of one in every six months, some of them having lived only six days. Remember also that the French House of Deputies is divided into ten parties, which again means coalitions, alliances, opportunistic expediency dominating many of the measures and the expressions of opinion. It is necessary for the French political leader and statesman to employ every one of the tricks in his bag in order to stay in office as long as he can, since after all, politicians like to stay in—for the good of the nation, of course. With these ten parties, there is a constant necessity for "trimming." The arrangement is strikingly different from our own, where, whether you like it or not, you are going to have four years, at least, of a Republican or Democratic regime in charge of the Executive Departments.

Consequently, you encounter in France that ancient political trick of pointing to the horrible menace of an outside enemy that lies just beyond our borders, or, better still, off into the vast darkness beyond the ocean, that terrible ogre that is going to reach over and devour the people, unless we all stand together and forget our petty little local and domestic friction, and rally 'round the flag and around the someone who heads the party at the moment. It is a well known trick, and it has been quite successful at times. The French used it for years in connection with the debt settlement. It figured conspicuously in every French political campaign, and now that the debt settlement has been cleared up and out of the way, and pretty well worn out through all these years of batting back and forth, along comes the tariff. It is a life-saver to many rather haggard and worn and desperate politicians, perhaps on both sides of the water.

When you read in your paper, as I hope you did, Briand's announcement of his program for a "United States of Europe," I hope you investigated most carefully the economic phases of it. They are much concerned with the United States, even though he solemnly declared that the plan is not aimed against the United States, not aimed against the League of Nations, not aimed against the sovereignty of any one nation or combination of nations in Europe itself. Just try to penetrate the economic causes of that. They are very interesting. See what you can make out of them on their face, and what might be behind. Some of the things that I hope to elaborate to you will be related to that factor. The way in which the tariff situation has been used politically has been illustrated time and again.

One of the most recent episodes is that connected with this lace schedule. Let me just lift a corner of the curtain and show you what actually went on in that particular sector of this front. Both committees of Congress rejected the idea of any change in the lace tariff, and the status quo was quite satisfactory to the foreign traders and manufacturers in practically every particular. Late one afternoon, as the Senate was staggering through the last final spasms of its share in this tariff performance, when there were six Senators on the floor, Senator Hebert of Rhode Island slipped through a motion very hastily (and with that dexterity which all of them know how to employ if they get such an opening) which increased all the lace schedules varying from 65 to 125 per cent over the present lace schedule that was in the Senate Bill. Within an hour after that had happened, someone was on the long-distance telephone with the French Commercial Attaché, whose office is in this city. This man talked with the French Embassy in Washington, and all agreed that there was no chance whatever of that preposterous proposal being accepted in the final bill—that automatically the conferees would throw it out—and subsequent events proved that this supposition was well founded and was perfect common sense.

The French Embassy sent cablegrams back to France and to all of the important lace centers, saying (in effect), "Forget this thing; this is just a temporary political gesture; don't pay any attention to it; nothing is going to happen." In spite of that, certain persons who had their political fortunes at stake in France went right ahead and planned great processions in the streets of Calais and the other great centers where lace is produced. Solemn protests were submitted to American Consulates and the American Legation, great placards were displayed. Other claptrap of that sort was continued for a solid week.

The real purpose, of course, was not to bring about what was absolutely certain to be accomplished anyway; the ulterior object was to indicate to the French citizenry and the French voters how deeply their interests lay in the hearts of their political leaders. And then, of course, since they knew perfectly well that this schedule was going to be changed, that the proposed increase would not go through, it was easy to understand why, the moment the conferees threw that lace schedule out (as they did immediately without any further ado), these same French politicians could write to their constituents and say: "Now there, you see—that shows how important we are. That shows how strongly we feel with reference to your problems and also how powerful we are in bringing these Yankees to their knees. The Congress is scared to death of us over here in the lace business, and we politicians saw to it that they came down good and proper." Naturally, right on the heels of all that hokum, came protests from six newspapers in the south of France, insisting that these mighty men of the French political circles should step out and do the same job for them. That was "something else again." That was a little more difficult. It "couldn't very well be undertaken at that late date"—and so forth and so on.

"Stage Play"

Now that is what actually went on in that whole performance. It was merely "stage play," frankly for ulterior purposes and benefits. It got everybody except the politicians exactly nowhere, and it did arouse a high degree of resentment and bitterness. It simply threw more gasoline on the fire, and the situation was frankly exploited for the benefit of the few individuals who had ulterior motives of that type.

That is the kind of thing we should guard against. Now that late episode has been "played up" again and again in responsible organs in this country (I refer also to certain trade papers) as an indication of the frightful

desolation that might be created in the circles of our friends abroad.

Tariff has enough sins without having some additional and wholly unwarranted charges of that type piled up against it. The statements that have been made in one or two of the more responsible newspapers in this country, I think, are worthy of pretty careful analyses because they are indicative of a state of mind that is current even in most intelligent circles. In the first place, a leading editorial in the New York *Times* headed "Two One-Sided Traits," maintained that the Franco-American economic relationship was entirely against the French and in favor of the United States. This editorial held forth at great length on the iniquity of that unbalanced situation—that we were buying from them only half as much (more or less) as we sold to them, and that was "too bad." It quoted, by way of substantiating the wickedness of that situation, President Prodel of the Lyon's Chamber of Commerce, who had said that there is a fundamental economic law that merchandise is only exchangeable against merchandise. That is just idiotic nonsense. The *Times* should have known better, and Mr. Prodel should have known better. Such a principle would certainly be pretty hard on a lot of editors and bureaucrats who have no merchandise to exchange for merchandise. In other words, the exchange of services for merchandise is just as much a part of the economic scheme of things as the exchange of various goods, and it applies exactly as much to the relationship between nations as between individuals. The proposition that we shall buy goods only from those who sell goods to us, and vice versa, leaves out entirely that element of transactions and services which are on a precise parity with the interchange of merchandise. In many cases, the profits involved are much, much larger than those concerned with the interchange of wares. Furthermore, the proposition does have the implications of attempting to force arbitrarily and beyond the bounds of economic sobriety the interchanges of merchandise, for merchandise is not interchangeable between nations, between governments. It is between persons who want something and those who have something to sell.

Imagine trying to insist that an American lady should absolutely confine her buying of European hats to French hats; although the French hats might be the best in the world, that is exactly the way to make her buy Latvian hats or some other kind of headgear. The folly of trying to force arbitrarily the consumption of goods of certain origins can be carried to an undue extremity, and it is that undue extremity that we must watch. Within certain limits the thing can be influenced, but only within those limits. The absurdity of that was revealed when the recent treaty was put into effect between Latvia and the Soviet Government, whereby the volume of trade between the two was arbitrarily fixed. It was definitely agreed that there should be so and so much exports and imports. The government has but very little to do with that kind of thing. It happens that most of Latvian buying is done by a lot of canny Scotchmen, who sit in Riga and buy bristles and hides and lumber and things like that. Imagine trying to tell a Scotchman that he mustn't buy so and so many bristles or that he must by so and so many hides from Russia or any other country.

Trade is almost the most elusive and evasive and liquid form of contact and is one of the most difficult things to control, especially when it involves interchanges of services instead of ordinary, everyday merchandise.

I wish to stress to you the character of these invisibles, the relationship between France and the United States, to illustrate clearly the dangers of confining one's conversation, in the discussion of the trade relations between the two nations, to the visible items. It happens that the visible ones are the only ones that are caught in the tariff maelstrom—that are, theoretically at least, checked in the Custom House. But the invisible items are of supreme importance, and it is amazing to see how otherwise well-informed opinion in the United States deliberately ignores those factors, despite their great significance.

With reference to France in 1928, American sales to France of goods, in the way of exports, ran to $219,000,000. American purchases of service to our tourists amounted to $215,000,000. Once again, when you calculate the fact that the profits made by American manufacturers on those visible exports to France were wholesale profits in bulk, while the profits made by the French people and French traders on that tourist traffic were made in large part by retailers, you know perfectly well what happens. When a French merchant sets his mind to it and realizes the general circumstances, his sense of charity is more or less tucked away, at least for the time being. So the profits on that $215,000,000 worth of tourist traffic will probably easily double those made by American merchants on the $219,000,000 of goods that we sold them. The $215,000,000 of their service sales to us, therefore, is more than enough to pay for the $219,000,000 of goods that we sold.

Editor's Note: This article will be continued in a succeeding number.

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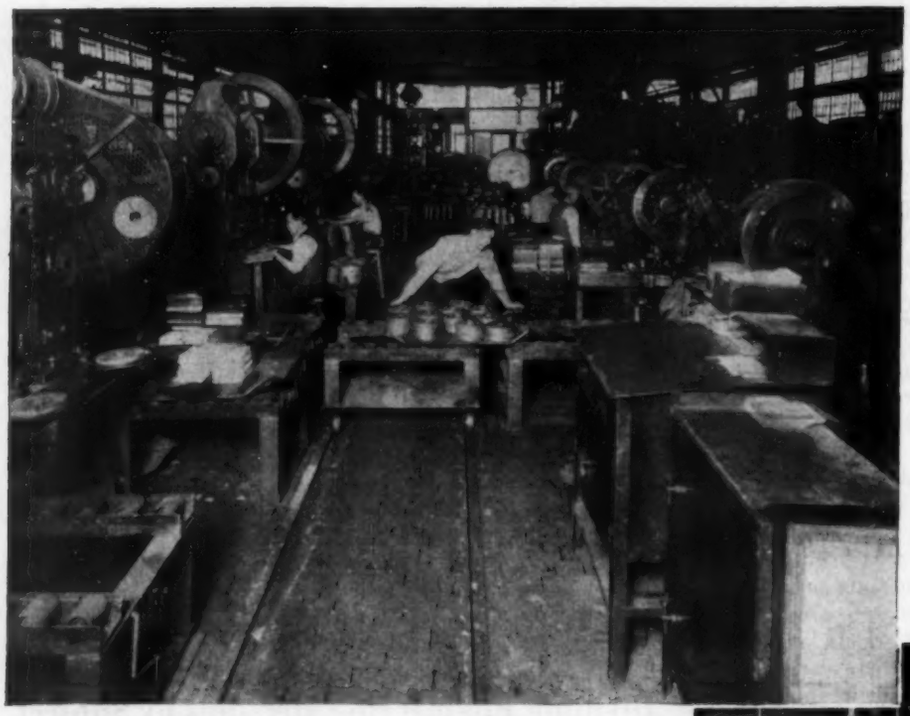
Dividing Engineering Meetings by Subject Or by Industry—*Discussion*

EARL L. FAIRALL

THE EXCELLENT editorial in Vol. 73, Page 66, of *American Machinist* presents a very logical solution to the vexing problem of attendance at engineering society meetings. After all, those who are interested in all phases of a particular industry, such as aviation, are comparatively few in number, being restricted in general to major executives. The rank and file of engineers and draftsmen, who are interested in the details ,are limited in their direct interest to perhaps one or two of the papers of a three-day session. General executives interested in all phases of an industry, besides being small in number, are interested in the general trend or high lights of each subject, the facts of which they can much more conveniently acquire from the summaries of such sessions in the commercial technical press than by personal attendance at all sessions.

I have found that in general meetings of the S.A.E., for example, I had far more personal interest in a paper on automobile finishes than I did in one on aviation gasoline specifications. I am interested in the structural design of airplanes, but not in the testing of aviation gasoline. I believe the suggestion in this editorial worthy of a fair trial, for, after all, it promises something to the point for the specialized technician of today—at least enough so to warrant the time and expense of actually going to another city for an engineering society meeting.

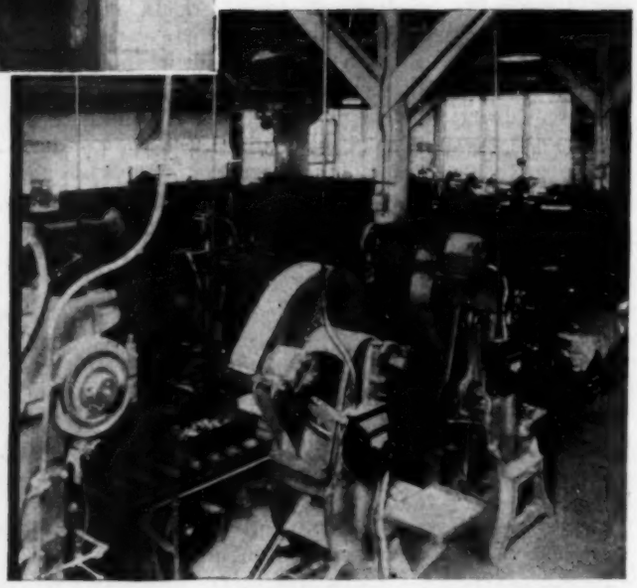
Two-Way Conveying *for* Metal Stampings



Special trucks guided by rails and equipped with roller tops transport materials from bench to bench and thence to the presses. Even the bench tops themselves are roller-equipped

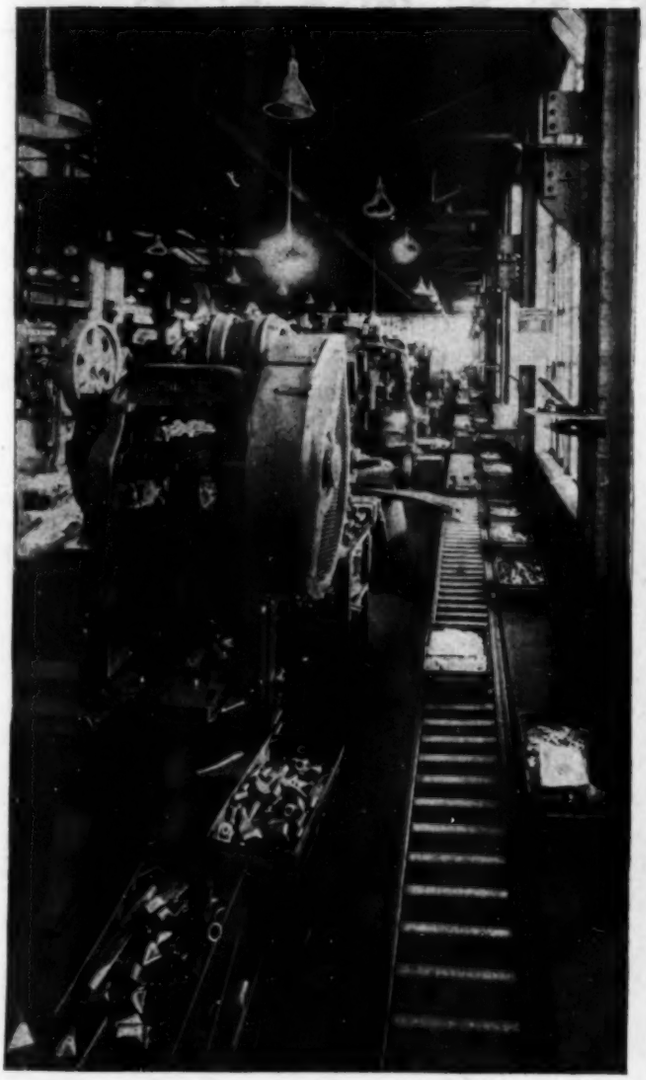
FACED with the problem of keeping parts in process on the move, the metals stamping department of the East Pittsburgh plant of Westinghouse Electric and Manufacturing Company resorted to a comprehensive, two-way system of roller and belt conveyors. Although the weight per stamping averages only a small fraction of a pound, about 3,000,000 lb. of finished material, requiring 8,000,000 lb. of raw material, passes through the shop every year. Inversely, the number of pieces handled is correspondingly great.

Altogether some 400 machine tools are fed by the system, raw materials being brought to the head of the line by shop motor trucks.



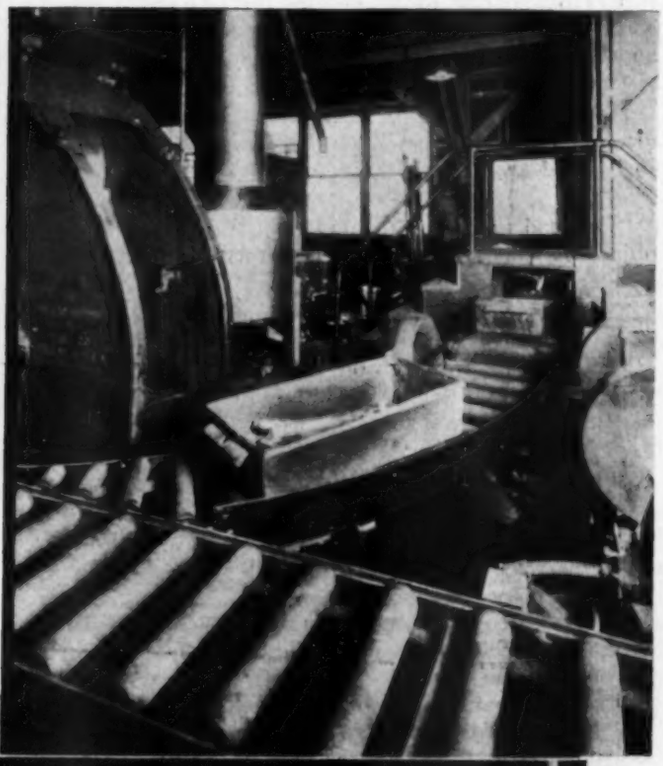
Tote boxes keep the various parts in process separated into classes and provide reservoirs ahead of the machines

Material coming in on roller conveyors is weighed, tagged, inspected, and hurried on its way



Gravity rollers furnish transportation in one direction; belt conveyors take care of the return trip

As though on a railroad, the tote box reaches a junction point in the system



Here the gravity conveyor becomes a temporary storage place as well. While the tote boxes stand still, assembled parts are withdrawn, cleaned, and replaced. A push of the hand sends the boxes on their way

EXECUTIVE FORUM

The Urge to Merge

"THAT WAS a pretty good idea of yours after all, Bill," said Ted Holden to Bill Holland, who had dropped into his friend's tool and die shop on one of his periodic visits. Three months before, Holland had found Holden poring over a set of books and had advised his sharing the services of a bookkeeper with other small shops in the vicinity.

Holden continued, "It works fine—saves me a lot of grief and doesn't cost much. It's worth a good deal just to get away from those double entry figures."

"I'm glad to hear that," said Bill, "and also that the objections you raised were not serious."

Ted Holden grinned. "Sometimes to get the best slant on a proposition, I argue against it. But now Harry Duncan, Joe Dickson, and I have an idea which goes yours one better. We're thinking of consolidating like the big fellows do."

"On the theory that if a little co-operation is good, a whole lot will cure all your ills?" asked Bill. "What is the advantage? Even if you combine with Harry and Joe, you won't have a large concern."

"There are many advantages," answered Holden. "Joe is a crackerjack tool and die man, while I specialize on jigs and fixtures. Harry is a natural salesman and could spend most of his time hustling for business. We could afford a full time office man with one or two assistants. Combining our orders and accounts would simplify clerical work. We wouldn't be fighting each other for orders, and we might get a better price for our work. The larger volume of business would mean lower shop costs, and we would have the advantage of our combined tool equipment. It looks like a good move to me."

"I don't like to dampen your enthusiasm," said Bill, "but, before you go ahead, look at the other side of the picture. You now have sole responsibility for your shop—you merge with Harry and Joe, and each of you must have his say. The result is a committee form of management which is never successful—there is no real boss. Each of you will let up a little and let the others do their share of the work, for after all each has only a third interest."

Holden shook his head. "No, if we go into this, it will be understood that there will be no letdown. We'll all have to plug just as hard as before."

"Maybe so, but the incentive is lessened," said Bill. "Besides, you would have the expense of moving your equipment. Unless my guess is wrong, your overhead will go up instead of down. I doubt whether in your combined shop you will get the volume of sales which the three of you are now handling independently. You will have an excess of certain equipment. You will not eliminate competition, as there are plenty of other small shops to compete for the business."

"You're pretty gloomy, Bill," said Holden, "but I'm not discouraged yet. This one-man business is a grind. Suppose I take sick or want to go away for a little vacation—when this happens now, things practically stop. With the three of us, this would be avoided."

"That's true," Bill agreed, "but the way I see it, a shop must be either large or small. The big fellow works on a quantity basis, and makes his money through production. The little fellow gets the special work through personal service and ingenuity. Between these two, you lose the advantages of both and do not gain enough to compensate for the loss. My advice is to go slow."

■

What Do You Think About This Executive Problem?

Mergers seem to be the order of the day, but do they fill the need for effective management? Will the small shop do better as a medium-sized shop, or will it lose some of the individuality which has helped retain its place in a world of big business? Is there any better way for it to grow, and is this growth always desirable?

Send your views on this subject to *American Machinist*. The small shop is still with us—what is its future?

. . . Discussion
of Executive Problems

■

Does Reciprocity Pay?

No! The purchasing department and the sales department are two entirely unrelated and distinct departments in every modern organization. They have only one point in common; namely, they are both responsible to the same president or managing executive.

No purchasing agent should be cramped and restricted by having to buy from or favor certain company customers. He should either have unrestricted authority in placing orders or not be expected to make shrewd purchases. When compelled either directly or indirectly to buy certain commodities from favored sources the purchasing agent becomes merely an order writer. His initiative is stifled, and he will lack that interest so necessary in making good buys for the company. A sales manager or sales department which has to receive support from any reciprocity agreement should either resign or be fired.

The most capable president, I ever worked with, laid down the law that the factory manager, who had charge of purchasing, was not to be tampered with by the vice-president and sales manager. All buying was to be handled without a single restriction on the purchasing department. —E. E. GAGNON, *Mechanical Superintendent, Raybestos-Manhattan Company.*

Can Engineers Sell?

The man to sell machinery should be a technical man. The other fellow might be a high-pressure salesman, but when the customer asks him how long it will take to trim down a shaft to a given diameter he will have to say, "I don't know, but I'll find out." By the time he gets the information, the competitor with the technical man has made the sale.

—J. WALTER WRIGHT, *Assistant to the President, Wilmot Fleming Iron & Steel Company.*

Wholesale or Retail?

Why shouldn't industrial plants buy articles for their employees? If a working man saves five dollars on some items which he buys through the company, it means that he has five dollars with which to buy a good steak, or possibly a pair of shoes, which he could not have otherwise. These items, which he buys with the money he saves, will as a rule be bought from the local business house.

In the machine shop, many of the small tools and instruments are very expensive. As a rule, many of these tools are not furnished by the industrial plant, but must be purchased by the employee. I consider it no more than right that the concern should give the employees the benefit of its purchase discounts.

About a year ago, I decided to expose myself to the gentle art of golfing. I was informed that I needed several curiously shaped implements and some small white balls. I started to price the equipment in the stores, and I immediately gave up the idea of playing altogether. As it happened, I mentioned the fact to the purchasing agent, and I was told that I could get between 20 and 25 per cent off the retail prices, which had been quoted me. Consequently I took advantage of this offer. I bought the clubs which I never expected to have, and I saved some money on them. As it was, I went down to the retail store the following day and purchased a dozen golf balls, whereas if it had not been for the company, that merchant would not have sold me a single thing. Did the retail store lose so much after all? I don't think so. If anything I believe it came out ahead of the game. —MAURICE H. BAITLER, *Perkins Machine & Gear Company.*

Success or Successor?

As far as possible, it should be the policy of every company to have alternates or successors for important positions. These men need not be acting as direct assistants to the present executives, but should be available with a minimum of organization changes. It is far easier for large concerns to maintain an organization of well selected men than small companies. With the small firms, the best positions require men in a class too far ahead of the ordinary man for a single step. Also the salaries are such that spare men of this better class cannot be carried along as there are not enough highly-paid positions. This leads to the practice of going along without provision being made for emergencies. When a change is necessary a new man must be hired.

The only type of executive who should fear his assistant's taking his position is the one that is not trained for promotion. Every good executive should be prepared for the next higher position, and at the same time, arrange that his present duties will be carried on when his promotion takes place.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Company.*

Is the Customer Always Right?

The problem of dealing with customers of the kind described is one of old standing, and unless a manufacturer is in a position to demand his rights, it is advisable to assume the customer is right and make the best of it. It has been the writer's experience that very often, through some simple little grievance over a first order, the grieved one has become distrustful of everything. This often comes about through personal dislike of a salesman or an erector quite independently of the goods supplied.

Some time ago, the writer experienced great difficulty in dealing with a customer of this kind. We had already supplied one equipment that gave a lot of trouble, and the second installation gave considerably more. The

cause of the bother was simply a personal grievance between our customer's chief engineer and our erector, which had developed to something like open warfare.

On supplying a third installation, we selected as our erector an old hand who had retired from outside work. Old Jimmy possessed a wonderful supply of blarney and could lay it on with a shovel. The result was that our customer's chief engineer was not only cajoled into taking charge of the job and erecting it with his own men but old Jimmy arrived home much earlier than expected with a pocketful of certificates, testifying that everything was in perfect order. —F. P. TERRY, *Belfast, Ireland.*

Is Incentive Necessary?

It has been my privilege to work where different wage incentive plans have been applied under both favorable and unfavorable conditions. The successful ones were where the work was repetitive and the operator class of workmen was employed. The unsuccessful one was where the work was large and varied and the men employed were highly skilled.

The details of the plans used were good in all cases, as was the response on the part of the workmen. The principal difficulty on heavy work in small lots is the setting of rates. Time-study cannot be used as it would require a rate-setter to stay at each job until finished. Estimating is difficult and uncertain as conditions such as hardness of castings and the amount of stock to be removed enter as unknown quantities.

When production is increased due to a wage incentive plan, it is often found that a fairly large percentage of the observed time is hand-time. The work should lend itself to time-study and be of a repetitive nature for wage incentive application. The greater the percentage of hand-time involved, the greater the savings should be.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Company.*

Jigs By Whom?

One very well-known company, with which the writer was once connected, had a chief engineer, whose claim was that "the shop can make anything my department can draw." This attitude brought about many headaches and much reviling on the part of the shop, and not an inconsiderable addition to the costs of the operations involved.

There is no doubt, but that under modern conditions of organization, an efficient designing engineer will have a very fair notion of the general principles of shop practice and can make profitable use of the initial knowledge, which he has of the particular parts and assemblies, to design fixtures and tooling for their production. However, in the cause of economy, it would be illogical for a designer to overlook the practical experience of the mechanics in the production department, or to fail to consider the variations in the situation, which shop or sales schedules inject into the problem. For this reason, while without a doubt a design of any sort can emanate more profitable from the engineering department, the best interests of the entire organization can be served only by the fullest co-operation between all departments.

—D. C. WRIGHT.

Wholesale or Retail?

This discussion mixes at least two problems, discount and service. The local merchant objects to our buying from mail order houses, but the purchaser sees no reason for paying extra dollars to the local man. He might just as well buy by mail and hand over his savings to the local dealer.

Service is an entirely different matter that the customer must consider from all angles. Should it be free, and if so, is it worth the difference between the wholesale and retail price? I recently bought an expensive radio locally because I felt it was worth the difference although I might have had a wholesale price elsewhere. But there are few cases where I would do this.

Local merchants frequently give altogether to much free service. Why should air for tires be free? I would much rather pay a nominal price than feel obligated to buy gas or oil or tires if I'd rather go elsewhere. It is simply a lure and should be charged up to advertising. —CHESTER H. FRANKLIN, *Consulting Engineer.*

Can Ideas Be Allocated?

In my opinion, the punching of a time clock by a designer or engineer before starting a problem, should not have a disturbing effect on the solving thereof. But when this is carried further and the stop watch is introduced, it is bound to react unfavorably with the average man.

Thinking against time, while necessary sometimes, is in my opinion a process attended by very uncertain results, in the engineering business at least. It is quite questionable if the time clock is necessary in any well-organized engineering department, as costs can be allocated without it.

I have in mind, a concern possessing an engineering staff of marked ability. The chief engineer on assigning a man to a problem, fills in a card containing the engineer's name and details of the work, and gives it to the department clerk. The engineer must report to the chief at stated intervals and where material requisition seems necessary. Upon completion of the work, the card along with the requisition slips are sent to the accounting department. This system has been found both economical and satisfactory. —ROBERT S. ALEXANDER, *Universal Winding Company.*

Success or Successor?

A supervisor can be measured by how well his work is carried on during his absence. This does not indicate that his job would run forever without a leader, as every unit of organization must have a head. However, during short periods of absence a department should function as though the leader were present, and in case of promotion, an understudy should be able to take over the reins.

A man who is capable of teaching another to handle his job is worthy of a higher position. This view of success rather than successor should be taken, as usually when an executive requires superseding, new blood is introduced rather than promoting the understudy.

—H. E. MCINTIRE.

Bulging and Flanging Shells

Discussion

JAMES R. CORNELIUS
Coventry, England

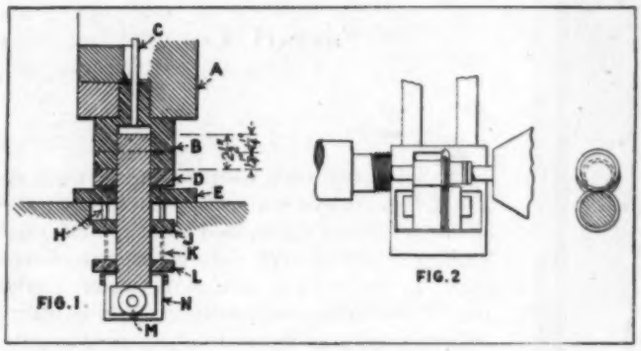


Fig. 1—Method of increasing the amount of draw
Fig. 2—Forming the flange bead by rolling

THE PROCESS described by Charles H. Willey, in an article under the title given above, on page 623, Vol. 72, of the *American Machinist*, can be said to be ingenious in one respect only, namely, the use of rubber to procure the expansion of the drawn shell. Otherwise, the process appears to be a lengthy one, especially where the loading and unloading of the dies is concerned, which, from the operator's view, is not as safe as it might be. The most costly part of the work seems to be in the drawing of the shell itself, three operations being required where one should suffice.

According to Mr. Willey, the necessity for the three drawing operations was due to the insufficient stroke of the press (3 in.), which under ordinary conditions should suffice for drawing a shell 2½ in. long. Personally, I am of the opinion that the difficulty lay in the use of rubber buffer blocks for the pressure plate, as it is practically impossible to draw a shell over 1½ in. deep with such buffers. Their use necessitates that the number of drawing operations be increased to at least two, although three were employed in the case cited. Steel springs permit a greater latitude as regards the depth of draw, which in this instance could have been made approximately one-half of the total depth without straining the metal, leaving an extra draw of 1¼ in. to be made.

Since it is not desired to increase the stroke of the pressure ring, there remains the alternative of giving motion to the center block. If the same amount of motion can be imparted to both the center block and the pressure ring (1¼ in. in this instance), a total stroke for the drawing of 2½ in. can be obtained, which is sufficient for the job under consideration.

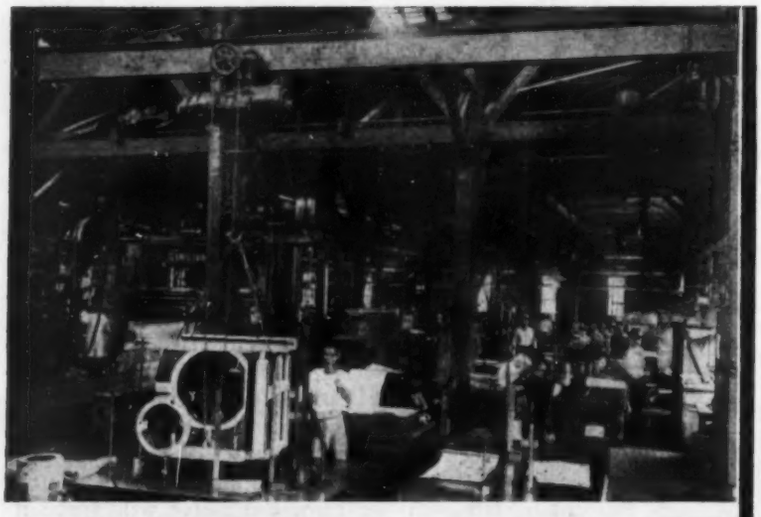
Referring to Fig. 1, *A* is the ram of a press having a stroke of 3 in., of which but 1¼ in. are utilized in drawing; *B* is the drawing punch; *C* the knockout pad; *D* the pressure ring; and *E* the bolster. The pressure pins are indicated at *H*, while the top (mobile) pressure plate is at *J*, and the pressure springs are at *K*. The bottom (stationary) pressure plate *L* is bolted to the bolster. At *M* is a camshaft carrying an eccentric roller, making one revolution to each revolution of the crankshaft, and is positively actuated from the crankshaft by some convenient means. A yoke *N*, to which up and down motion is imparted by the camshaft and the roller, is attached to the lower end of the center block.

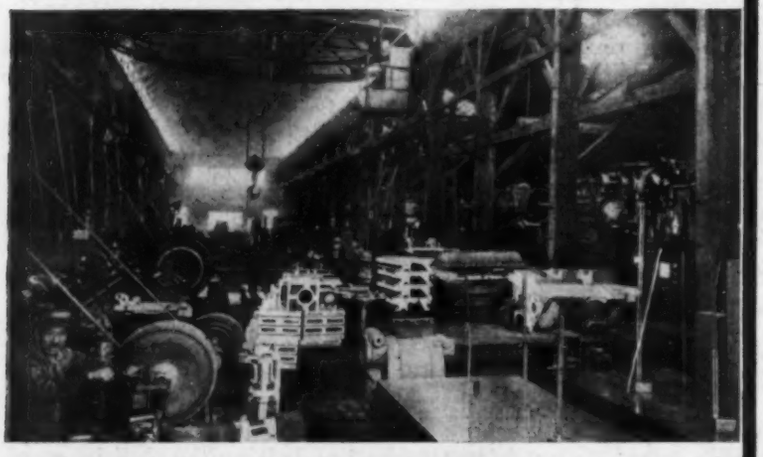
It will be seen that when the crank is in its top position, if the stroke of the eccentric be 1¼ in., then during the down stroke of the ram, the roller will force the center block upward while the punch is forcing the pressure ring downward. Since the actual draw depends initially upon the difference in position between the respective top faces of the pressure ring and the center block, there will be a total of 2½ in. of draw, with a punch stroke of 1¼ in. and a spring compressive stroke of the same amount. On the upstroke, the ram knockout will eject the drawn shell from the punch and the roller will force the center block to redescend, while the springs will force the shell from the center block by means of the motion of the pressure ring.

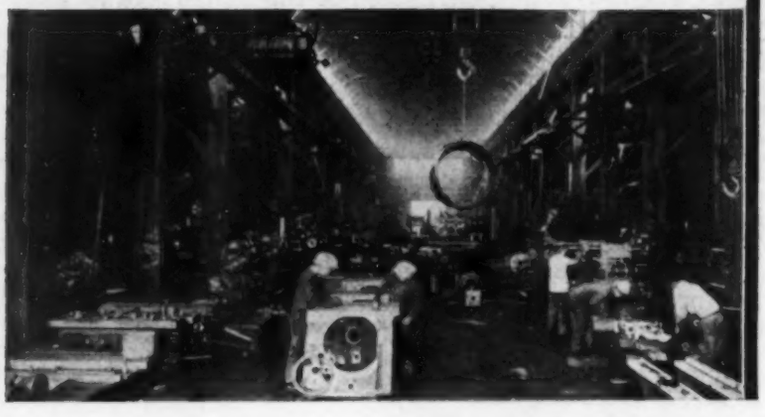
The cost of transforming a short-stroke press into one having a long-stroke action is negligible when the increased benefits accruing therefrom are considered, especially as the stroke given to the center block may be varied in length and time of stroke, at will.

Personally, the method of bulging the shell by means of the expansion of rubber does not appeal to me. I would sooner make use of a small lathe, preferably a spinning lathe, and spin, or roll, the shells into the shape shown in Fig. 2. A formed mandrel is fitted in the spindle and the drawn shell is placed over it, being pressed against it by a spring-loaded buffer in the tailstock. A roller having a groove to match the raised part of the mandrel is pressed against the shell, forming the bead. This method gives a bead of predetermined shape and diameter, whereas in forming the bead by the expansion of rubber, one must be satisfied with the results obtained. One disadvantage of using rubber disks for expansion of the shell, is their rapid deterioration under such treatment.

A Growing Machine Plant in Japan







Fred H. Colvin
Editor

As IN our own country firm names do not always convey much idea of the business behind them, and are, in fact, misleading. The Tokyo Gas & Electric Company, at Omori—a section between Toyko and Yokohama—originally a public utility company as the name implies, now manufactures a varied line of machinery including machine tools, motor trucks, electric hoists, and air brakes for railway use. Each kind of work is segregated in its own department as far as possible. The buildings are arranged in bays, each a single story in height, and all are well lighted and ventilated.

These buildings are of what we frequently term wooden mill construction, with steel beam jib cranes for runways for overhead hoists, one of their own make being shown raising the shaper bed from the surface plate where it has been laid out for planing, boring, and drilling. It must be remembered that few Japanese shops have yet reached the production which would warrant the use of expensive fixtures on work of this kind. Fig. 1 shows the type of shaper bed used, as well as the large squares, surface gages, and other tools used in laying out the bed. Other surface plates are also shown, and at the left is a well known American planer. The Japanese appreciate the value of modern machine equipment.

In Fig. 2 is seen a section of the lathe department, parts of different types of machine tools in process of building, a better view of the type of building construction used, and the deep-trussed traveling crane that runs the whole length of the monitor, serving many of the heavier machines. This view shows a shaper bed in the background with the shaper rams at the right, near the milling machine tables. On the planer table is part of a heavy machine, and, in front,

Notes and views tell a story of real advancement

◆

the tailstock of a large lathe, these being fairly typical of the variety of machines built in this shop.

The planer department is small. Fixtures are used, and there is an industrial railway that brings heavy parts from other departments. Hoists and an overhead track make it possible to pick up parts and carry them to any machine desired.

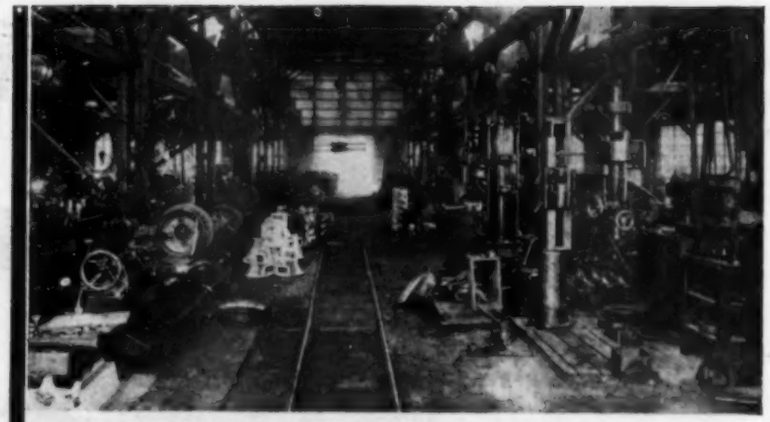
Machine tools are erected at one end of the central bay, as seen in Fig. 3. The parts can be handled by the traveling crane and the completed machine carried to the point from which it is shipped. Lathes, milling machines, and planers are shown in course of erection.

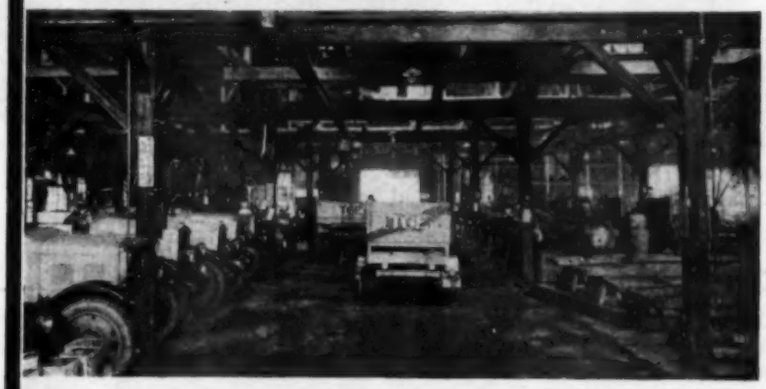
Motor truck building has not been developed to the same extent as the machine tool department, but good progress is being made in the building of fairly large motor trucks and motor fire engines. There are no special machining methods, but Figs. 4 and 5 give an idea of the work being done by this department. Differential housing covers are shown at the lower left, transmission cases in the center, of Fig. 4.

The truck erection department is seen in Fig. 5. Frames are on the right and finished trucks on the left and in the center. Overhead hoists and other handling devices aid in reducing hand labor in erection.

In another bay, Fig. 6, is the department for manufacturing the electric hoists. Here again there are no special methods in use, but jigs, fixtures, special tools, and gages are being introduced both to insure interchangeability and to reduce costs. The number of hoists shown partially completed at the left is an indication that hoists are being appreciated and that this portion of the business is reaching satisfactory proportions.

Still another department, that of the air brakes, has also reached the manufacturing stage, as can be seen in Fig. 7. Machining presents no special problems. The work is mostly plain boring, facing, drilling, and turning. Assembling, after inspection of parts, and testing of the completed units are done in the usual manner. Altogether the shop of the Toyko Gas and Electric Company is typical of the advances made in Japan in its machine producing plants.





A REPAIR POLICY THAT W

How a little resourcefulness helped one company keep the wheels turning during a slack period

BUSINESS was slow this summer, and ours of diehead manufacture was no exception. Still, we realized that it was a poor time to reflect on the unkindness of fate or to shrug our shoulders in acquiescence to the workings of a dominant economic force. Instead, we made an effort to do a little serious thinking, and this was the result. The purpose of this dissertation is not to glorify our superior power of foresight, for we have no illusions on that score. On the contrary, we believe we followed a rather obvious course, but we did that systematically—and with gratifying results. We tell our story solely in the hope that others in a similar position may derive an idea or two which may prove to be of practical value.

We started on the premise that most shops today are sold on the practice of repairing the roof before it rains—that most are willing to put their equipment in first-class condition when the time and opportunity present themselves. There are thousands of H & G dieheads scattered about the country, most of them in the hands of people who know good tools and appreciate that if they are to return maximum service they must be cared for. These dieheads received hard usage during the past few years, and were invariably in such continuous demand that they received little or no maintenance. The best of tools require attention, and it seemed logical to conclude that a good percentage of the H & G dieheads needed a thorough overhauling.

A diehead repair policy was therefore inaugurated, and a printed statement prepared explaining it. Copies of this statement were mailed to each customer, and others were used by our salesman when making calls.

The H & G Repair Policy

TO ENCOURAGE the periodic return of dieheads to our factory for inspection and overhauling, we have adopted the following liberal repair policy.

1. Dieheads will be thoroughly inspected and checked by our gages without charge.
2. Repair work will be done at actual cost.
3. Repair parts will be furnished at cost when the repair work is done at our factory.
4. A report of the condition and an estimate of the repair cost will be furnished if requested before proceeding with the the repair work.
5. Where important and possible, dieheads may be loaned to take the place of those returned for repair.

H & G workmen are especially trained to perform this work with

RETURN DIE HEAD INSPECTION AND REPAIR REPORT

OUR ORDER NO. 4597 CUSTOMER'S ORDER NO. 5409 DATE 5/27/30
CUSTOMER [illegible] G. REFERENCE
CUSTOMER'S REMARKS Repair
D. H. SIZE 1" STYLE A SERIAL NO. 1006 SPEC. FEATURES Knurled
SLOTS (WIDTH) .090 SLOTS (DEPTH) CAMS Open
REMARKS Front Plate to be ground Test Shank

Part No.	NAME	Needs	Used	Price	Part No.	NAME	Needs	Used	Price	Part No.	NAME	Needs	Used	Price
1	Body				18	Lock Pin Spr.				38	Bayt' Spring			
2	Shell				19	Lock. Pin Stud				39	Shank Spr. Scr.			
3	Front Plate				20	Lock. Pin Bush				40	Shank Spring			
4	F. P. Screws	X	8	20	21	Lock Pin Block				42	Trip Button			
5	Back Plate				22	Trip Lever	X	1	25	43	T. B. Bind. Nut			
5	Guide Pin Coll.				22	Comp. Spr. Scr.				44	T. B. Adj. Screw			
6	Dowel Screw				23	Trip Lev. Stud	X	1	05	45	Heat Sh. Bush.			
6	Bck. Plate Screw	X	4	10	23	Comp. Spring				46	T. B. B. Nut Wash.			
7	Chaser Cams	X	4	150	24	Trip Follower				47	Stp. Pt. Stp Pin			
8	Class. C. Studs	✓	4	10	24	Comp. Spr. Bush.				50	Lock. P. Adj. Nut			
9	Open. Springs	X	2	15	25	Trip Lev. Spng.	X	1	05	51	Bat. Spr. Bush.			
10	Op. Spg. Fulc				26	Adj Screw	X	1	05	52	Bat. Spr. Pivt.			
11	Stop Screws	X	1	17	27	T. B. Adj. Screw Pin				53	Bat. Spring			
11	Stop Plunger				29	Bind. Screw	X	1	02	54	Bat. Sp. Pt. Pin			
12	Stp. P. Spng.				32	Spiral Cam					R. & F. Attach			
13	Stp. Pt. Bush				33	Sp. Cam Screw					Grinley Collet			
14	Class. Cam Coll.				34	Handle					Bushing			
15a	C. C. C. Rollers				35	Spiral Cam Scr.								
15b	C. C. C. Shoes				36	Handle Bushing								
16	C. C. C. Roll. Pins				36	Spiral Cam Pin								
17	Lock Pin	X	1	25	37	Shank								
	Total			2.82		Total			42		Total			

TOTAL COST OF PARTS 2.84
HOURS LABOR SCHOLL 5 5.00 INSPECTED BY WFF DATE 5/27/30
HOURS LABOR NELSON 4
TOTAL COST REPAIR 7.84 REPAIRED BY 123 DATE 5/29/30
Form 5c 5-31-27 2M

The inspection and repair card aids in costing and executing the various steps in diehead overhaul

AT WORKED

C. W. Bettcher

Secretary and Sales Manager,
The Eastern Machine Screw Corporation

maximum efficiency, while our facilities as to tools, fixtures, and gages, insure the utmost accuracy of repair and that the head will be made practically as good as new.

When a diehead is received at our factory for repairs, an inspection card is made out, and a thorough inspection of the diehead is made. Our men know just what to look for. The card, it will be noticed, has a column to show what new parts will be needed in the repair. Where the cost is wanted in advance, these parts are priced, and an estimate of the hours of labor entered. From this the probable cost of repair may be calculated and quoted to the customer in much the same way as the costs of valve grinding or brake relining are quoted today in modern service stations.

It so happens that the design of the diehead is such as to lend itself readily to repair and overhauling. For example, if the depth of the chaser slots is too great, the face of the body, bottom of slots, and front plate may be reground and the face plate reground, bringing the slot depths back to their original dimensions. Where chaser cams are worn, new ones can be installed. The worn locking mechanism is also easily replaced. During inspection, the alignment of the diehead body with shank is tested.

After the diehead is repaired, it has to pass through the rigid inspections given new heads, except where the head may have been badly marred in service and these marks cannot be eliminated. However, a great deal of pride is taken in the appearance of the repaired head, and it is refinished to look as nearly like new as possible.

Each chaser cam is checked to make sure that the ground bearing edges that engage the chaser are exactly the same distance from the axis of the diehead

Chaser slots are inspected for depth and reground if necessary

The transformation which takes place, as well as the relatively low cost, has always surprised our customers. It so happens, that when the repaired dieheads are returned, the operators are more likely to take good care of these tools because their excellent appearance naturally commands more consideration.

Carrying out a campaign for reconditioning dieheads, such as outlined above, works out to the decided advantage of both our customers and ourselves. They have their tools put in A-1 condition at a time when they can spare them and at nominal cost which is in reality a very low premium on insurance for future efficiency. We are enabled to keep expert workmen employed at a time when we are best able to do this class of work. Since October of last year, nearly 100 dieheads per month have been repaired on this basis.

■

Casehardening Vs. Nitriding

H. W. McQUAID, writing in E. F. Houghton & Co.'s *Black and White*, sums up his discussion under the above title with the following words: "As a tentative estimate it is believed that, with the present price of ammonia and of nitriding steels, there exists a difference in favor of casehardening of at least 4 cents per pound. This is due principally to the higher first cost of the nitriding steel, and the extra cost of machining. However, a properly nitrided steel is very resistant to ordinary atmospheric corrosion, so that where this property is of value, the additional cost per pound may become a point of lesser importance.

"The advantage of the nitrided piece over the casehardened piece lies in its superior resistance to wear and corrosion, and in its relatively low distortion. The difficulty of machining the nitriding steels and the higher first cost, combined with the present undeveloped state of the furnace equipment, etc., results in an excessive final cost which will prevent the widespread use of the nitriding operation as compared with the casehardening operation. In event that the first cost of the material can be reduced and the machinability improved, the nitrided article will become a more serious competitor with the casehardened article for most parts."

The Foreman's Round Table

THE COMMUNITY FUND

"MR. BROWN just called up and wanted to know if you were in," said Al's clerk.

"Which Mr. Brown? Oh! you mean Ed Brown," answered Al, as his friend Ed appeared in the doorway.

"Hello, Ed, you needn't tell me your troubles. I was just reading my copy of that letter you have in your hand. What about it?"

"Everything, I don't see why it is that everyone above the rank of foreman can 'pass the buck,' but when it reaches us it sticks. I'm not a good salesman or a good beggar, and I don't want to have anything to do with the community fund this year—or any other year, for that matter. My men resent being forced to give. We have a rule against soliciting, and still the management does this every year."

"I know, Ed, but look at it another way. The fund is a tax on the community, and the only direct tax that many pay. Since the world began, the tax collector has been unpopular. I agree that there are too many societies, but the main idea of a society is to support a secretary and there are lots of secretaries. I know of one city that has 138 organizations, a smaller city near it has 116. I know of one society that was budgeted for $12,000, and it had four lady secretaries at $2,000 a year each."

"That part of it is all right, but if it's a tax why not make the man pay it, or take it out of his envelope. I understand they do that in some towns. They assess each man fifty cents a month. He can either pay it or go elsewhere. The result is they pay, and the foreman doesn't have to argue and plead with them."

"There are two reasons, Ed, why we don't do it that way. It can't be done legally, and the old man feels that every man should give freely. Fooling aside, it is a tax, and we should tell our men that they must pay it."

"Must is right. Do you know how much we collected last year? We asked for voluntary offerings and got money from about twenty per cent of the men, the average contribution was a dime, not a dime a week, but one thin dime. I don't intend to go through that same experience again this year. You can bet on it. I will post the notice and let it go at that."

"The trouble is, Ed, that the men have a distorted viewpoint on charity. You're not a good salesman. Explain the community fund idea to them, tell them it is the only collection during the year. Just think of 138 separate societies soliciting, of finding someone on your stoop every night when you go home."

"Why should anyone sit on my porch, why shouldn't the rich do all the giving, or the companies in proportion to their size? It doesn't benefit my men any that I can find out. When we were slack last winter, one of them went around to one of the societies for help, and—"

"Yes, I heard about it. They investigated and told him to sell his automobile or piano, and he got mad about it. That man came to this country ten years ago dirt poor; now he nearly owns his house. These societies are not to help people with automobiles and pianos, but really poor people."

"Yes, and secretaries."

Are we justified in considering the community fund a tax and in using a "club" to collect it, or should the entire burden of charity be borne by the rich? Is it right to force a man to contribute to a cause that he will not support voluntarily?

Contributed by James K. Matter, Supervisor,
E. G. Budd Manufacturing Company.

▸ ▸ ▸ Discussion of Former Topics

Honest Graft

There is no such animal. Why should any man be compensated for time spent to learn something which will be of far more value to him than to the employer who is paying for this acquisition of knowledge?

Any man who expects to get ahead surely knows that he must have a more thorough understanding of his job to do so; therefore he must study, and if his employer is willing to pay the expense of teaching him, that man is getting far more than he is entitled to. The same applies to the hourly rate men; for they can only get promotion through a more thorough knowledge of the job.

There is also the employers side of the question to consider. For example, a large machine shop here in the East had a school in advanced mechanics and mathematics. This school met three nights a week in the company dining room. The company procured instructors from M.I.T. to teach the class, supplied a good supper for the men, and paid for all materials used. These classes ran all one winter, and at the end the company's gain was figured. As we all understand, all the men attending could not be promoted to foremen for some years to come, any more than the foremen could become superintendents, nor could the company afford to raise every man's pay just because he had a better understanding of mathematics. The net result was that a good percentage of the men took employment elsewhere as foremen, for they would have to wait too long where they were. This company, then, trained men for some one else which did not give a very satisfactory feeling to the employer who paid the bill.

I cite this case merely as proof that it is the individual who gains 95 per cent to the employer's 5, therefore why should they get paid. Any man in the employ of a company that is willing to spend money to educate him, had better take advantage of it.

—CHARLES R. WHITEHOUSE, *Standards Engineer, The Holtzer-Cabot Electric Company.*

The Safety Court

Figures prove that the majority of accidents in plants are due to culpable negligence on the part of the men. That is natural. Machines are positive; men miss strokes occasionally.

In press shops, where we lose dozens of fingers a year, the specific reason is that operators become hypnotized by the monotonous regularity of motion, and after a while they get out of time with the machine. Then there is an accident. But the real cause is that men are paid on a piecework basis, and they naturally push the speed up to the danger point.

Men don't get hurt intentionally, and it seems very poor business to prosecute them on general principles. On the other hand, a certain type of men is prone to carelessness. Such men should be weeded out. Safety campaigns should go on—the court, no. Prosecuting all cases reminds me that I have in my possession a safety bulletin issued to me fifteen years ago by a large mining company. On the cover is this slogan: SAFETY, FIRST, LAST, AND ALWAYS: GET BUSY AND MAKE MORE COPPER. High production means speed and some accidents. Low production means fewer accidents. Irritating the men with safety courts will not keep production up and accidents down. Continuous, careful training does it.

—JAMES K. MATTER, *Supervisor, E. G. Budd Manufacturing Company.*

High Rates

Working rates must be governed by the man's ability and also by the cost of living. While some men are conscientious enough to work for a dollar a day if necessary, the employer should not take advantage of this fact. A man is entitled to a fair living if he is worth hiring.

I think it will be generally agreed that most men are working for a living. To keep a man interested in his work, the employer must show he is interested in him, and this usually means a fair rate.

Some men are exceptions to this rule. You might pay these exceptions double the normal rate and they would show no more interest. This type of man usually requires attention: perhaps he can be transferred to a job more suitable to him and more profitable to the employer.

Quite often there is a variation between what the employee thinks he should receive and what the employer knows he is worth. But the fact still remains that the most of us are working for money.

—W. F. OBERST, *Assistant Superintendent, Grinnell Washing Machine Company.*

The Chain Store Problem

When foremen are free to make rules for their respective departments, such rules should always be countersigned by the superintendent. Such countersigning immediately opens a channel of redress to a department that is adversely affected by the ruling.

Where there exists such a state as that instanced, the cohesion so essential between departmental foremen for smooth running cannot exist, and the only remedy is to take the grievance to the foreman responsible, failing that to the superintendent. If I were accorded the doubtful privilege of framing my department rules relating to privileges there would be no privileges, except in extenuating circumstances, and certainly the installation of a sweetmeat booth would not be one of them.

In granting privileges one has to divide them into two classes, personal privileges and working privileges. Under the heading of personal privileges would come the subject of leave, the granting of which would depend upon the reason for the request, its effect on work in hand, and the frequency with which it is asked.

Under working privileges we are faced with a different set of problems. One man does good work in a certain way contrary to the orthodox method, another, for

reasons known to himself, desires the same privileges, but his foreman knows that he has not the skill or the "kink" to adopt that method successfully, hence a disgruntled workman.

The granting of privileges, therefore, cannot be subject to hard and fast rules, except that of not granting any, for conditions on the spot must determine the decision, in which case one cannot be influenced by the fact of "each man having equal rights." The observance of such a dogma would speedily wreck discipline.

—LEONARD COOMBES, *Foreman, Warwicks Time Stamp Company, London, England.*

Quality or Quantity?

The first duty of any foreman is to get out the work accurately and cheaply. To do this he must constantly instruct and coach his men along the right lines. The shop life of a foreman would be a path of roses if all his men were excellent artisans. Since this condition cannot be realized, he must aid the ordinary workmen and apprentices in his department to become more highly skilled. He must not expect too much from the apprentices. They are present more as learners than producers.

Apprentices, in some way or other, must be present in every shop. This is the only way to keep up the supply of skilled mechanics. Men are not born with the knowledge of a trade, but must learn it. And the best place to learn is in the company of skillful men. At the start of apprenticeship the boys should be segregated. At this time they should be taught the principles of the trade along with mathematics, blueprint work, and other things that will aid their mental development. They should also be instructed in the operation of machines, in the care and use of tools, and in the handling of work at the bench.

After they have become grounded in the why of things, they should be placed in the various departments of the plant, and advanced slowly and carefully from doing simple work as learners until they are able to handle the run of work in the department as full fledged producers.

—L. O. BROWN, *Toolroom Foreman, Holcomb & Hoke Manufacturing Company.*

Experience or Authority?

There should be no conflict between experience and authority; the case cited is one of rank insubordination and should be dealt with as such.

It is true the experience of the operator may qualify him to grind drills himself for special jobs, but for special jobs only. Not one supervisor in a thousand would object to this; in fact, they would encourage it, if the operator has ability.

The fact that the operator may have run the same drill for years might indicate that he knows the machine better than anyone else and this knowledge might be of assistance in determining the repairs required. It certainly does not indicate, however, that he would be the best man to make repairs. In fact, he might well be the poorest hand in the shop on this class of work.

The remedy for operators who take it upon themselves to decide when a machine needs overhauling and then proceed to do so in defiance of orders, is obvious.

—ED SEARLES, *Master Mechanic, Naval Aircraft Factory.*

Why Conferences, Anyway?

Conferences serve a most useful purpose when they are wisely directed, when their terms of reference are carefully defined, and when everything is undertaken in a serious and business like manner.

Much, of necessity, depends upon the personality and tact of the chairman. Where go-as-you-please represents the spirit and temper of the meetings, the chairman being too readily acquiescent and easy going, there is little hope of constructive work resulting therefrom. Under such conditions the conference too often degenerates into acrimonious bickering between aggressive and dogmatic members. It should be realized that the conferences are campaign councils, that they are held for the sole purpose and with the sole objective of aiding economical and efficient production and stimulating demand.

—W. R. NEEDHAM, *Stafford, England.*

Under Cover

The under-cover system employed in industry may or may not be underhanded, depending upon one's viewpoint. But, regardless of what we think of the system, who cares if there are one or a dozen under-cover men in the shop? The boss no doubt felt justified in employing them because he had an inkling that all was not well and he wanted to get to the bottom of the trouble. Every man passes one or more plain clothes men on his way to work almost daily. He passes the policeman on his beat and he gives him only a passing glance. He does not hate the policeman because he represents the law, neither does he fear him. It would make little difference to him if the policeman were in plain clothes, because he has no intention of committing any crime. He is not seeking to hide anything from the law, and he knows that the policeman is just as ready to protect him as he is to arrest him. Only the criminal fears the policeman or the plain clothes man.

Of course the duties of the under-cover man in industry differ from those of the policeman, but why fear him? The man who knows his work and does his work well has no objection to the boss checking up on him. If he is a good conscientious worker he has no desire to hide the fact from the boss. If the foreman objects to the under-cover man, the boss will sometimes think that all is not well. He figures there must be some reason for his objections. —W. J. OWENS, *Foreman, Newport Rolling Mill Company.*

Closing the Door to Late Comers

Al was evidently right in laying off three men. The mere fact that he had to lay off three men instead of one shows the need of drastic action. However, I have found, when up against similar problems, that if I get together with the men and discuss the situation with them, they are usually reasonable, and I seldom have to take action. It is perfectly natural for men to take advantage of any laxity of enforcing rules. If Ray Berry can come in late and get by with it, Tom Jones will think he might just as well be a little late too. However, when the men find it won't go, they will be on time, and Al will find that laying off the three men will be a gain and not a loss.

—H. W. AULT, *Wheeling Steel Corporation*

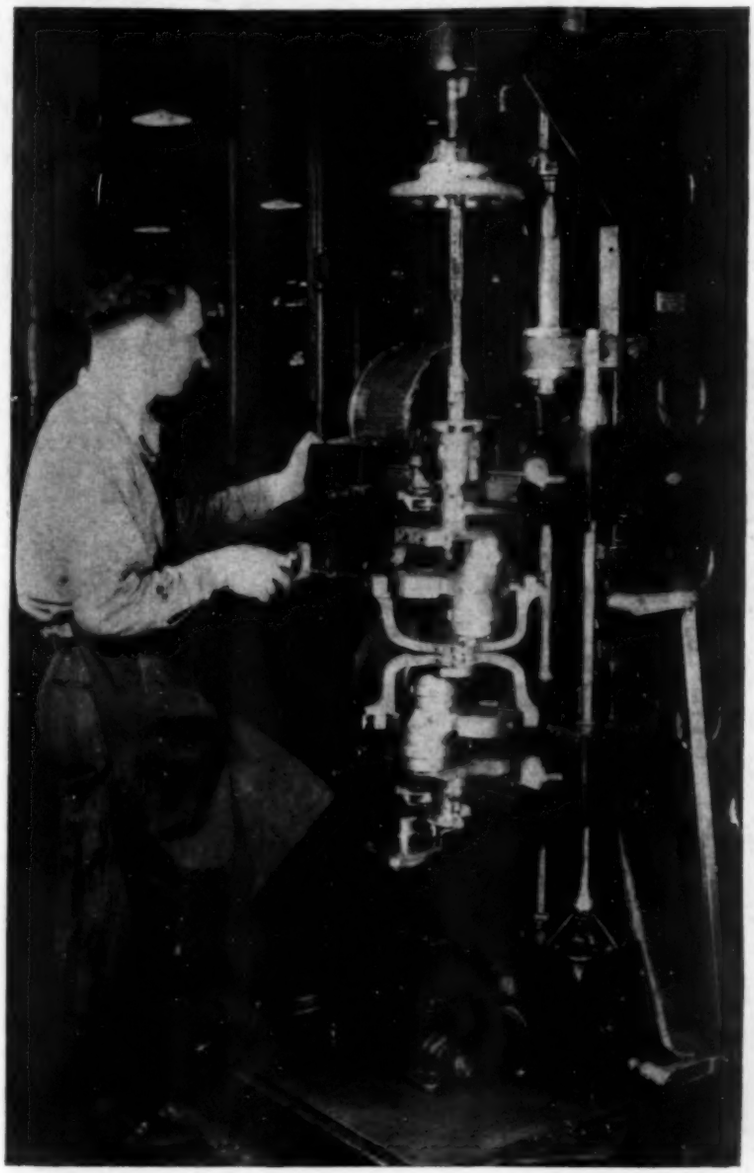
Practice in PRECISION By Cadillac

HERBERT CHASE
Associate Editor

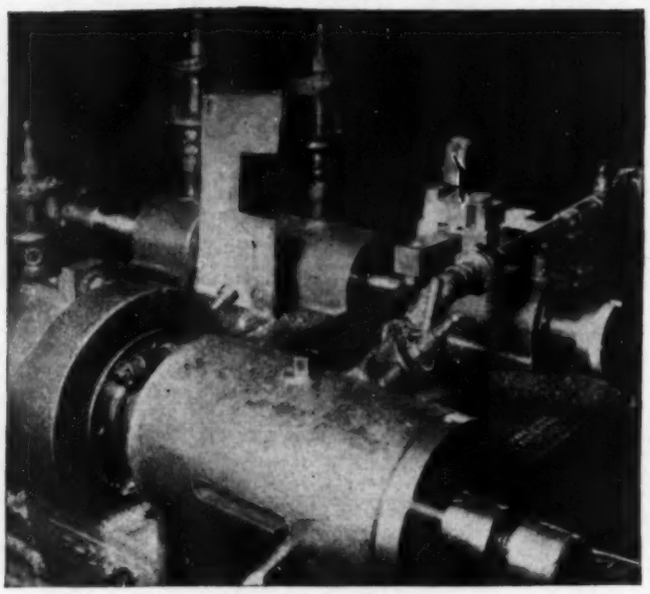
WORKING to extremely close tolerances both as to dimensions and weight proved to be the chief problem met and solved in producing the sixteen-cylinder Cadillac engine. Aside from certain features of the overhead valve mechanism, which is made to run without tappet clearance to minimize noise, the parts of this engine do not differ greatly in general design from that of other large engines. Consequently the parts are produced by much the same methods used heretofore in the Cadillac plant.

To attain the degree of refinement, length of life, freedom from noise, and absence of vibration required in a car selling in the highest price range, it is essential to work to unusually close limits, and to finish many parts all over that otherwise might be left rough on some surfaces. Grinding, polishing, and lapping operations represent a considerable portion of the total machining cost of the Cadillac engine; and only a few of these operations can be done on fully or even semi-automatic machines. Hand fitting is avoided, so far as possible, by holding the parts to very close limits at the machines, but selective assembly is employed in some cases to insure the close clearances called for.

At present about 500 operations are performed with tungsten-carbide cutting tools, not so much to increase speed in machining as to avoid the delays otherwise required to keep tools sharp and to maintain the close limits specified. This applies in particular to the aluminum alloy crankcase and to other cast parts in which small hard spots, probably caused by minute inclusions of silicious material, have a tendency to dull ordinary tools rapidly, and in consequence, to cause rejections otherwise avoided. Tungsten-carbide tools are found to run from 25 to 30 times as long between grinding as do tools of



General Motors machine used for balancing crankshafts and other rotating parts. Spots of light thrown upon the scales trace curves showing the location and amount of unbalance



Machine used for simultaneous diamond-tool boring of connecting rod big end bearing and piston pin bushing

high-speed steel in machine work of this character.

The babbitt crankpin bearing and the bronze piston pin bushing in the connecting rod, and the main bearing and camshaft bearing bores in the crankcase are diamond bored. This method is used for the extremely smooth finish it produces, and also for the very close limits desired without frequently regrinding and resetting tools. Some diamond boring tools employed in the Cadillac shop have been in use continually without redressing or resetting for as long as two years.

Crankshaft forgings, received already heat-treated, are finished all over. All bearing and crankpin sizes on the shaft are held to ±0.0002 in., the final operation being hand lapping. Crankshafts for both the eight- and the sixteen-cylinder engines are completely machined without any straightening operations and are required to show a runout not exceeding 0.001 in. upon final inspection. One of the major machining operations on the crankshaft for the eight-cylinder engine, the facing of all crank-throw checks and turning of crankpins simultaneously, is done on a semi-automatic lathe having heavy reciprocating tool slides. This machine performs in a single operation work which otherwise would require at least four separate machines and four tool set-ups, as well as four operators.

In common with all other major rotating parts, the crankshaft is balanced carefully both statically and dynamically, the latter operation being performed in the vertical machine developed for this purpose by the General Motors Laboratory. This machine is so made that a spot of light automatically traces a curve showing the degree of unbalance and the points at which metal must be removed to put the shaft in balance. The degree of crankshaft unbalance is held within $\frac{1}{16}$ ounce-inch.

Clearance between the crankshaft and its main bearings is held between 0.0015 and 0.002 in. and is checked with a dial gage by prying the shaft with a lever after the shaft is assembled in the crankcase.

Connecting rods are of alloy steel and are machined after heat-treating, great care being used to prevent scratches or sharp corners at which a flaw might develop. Both ends of all rods are weighed carefully and are held within $\frac{1}{64}$ oz. of the standard weight. Extra metal at each end is left in the forging so that some can be removed without detriment to strength in order to hold the desired weight limits. These operations are performed, of course, after the rod is completely machined, assembled with bronze piston pin bushing pressed into place, the big end babbitted, and both holes diamond-bored simultaneously in a set-up designed not only to keep both hole axes exactly parallel, but to hold the center distances within extremely close limits.

Connecting rod forgings are heat-treated to show 255 to 295 Brinell hardness before any machining is done. One of the operations performed is the rifle drilling of a $\frac{7}{32}$ in. hole 9 in. long in the I-section of the rod to lead oil under pressure from the big-end bearing to the piston pin. This hole must be straight to avoid breaking through

Machine developed by Cadillac engineers for rifle-drilling connecting rods. $\frac{7}{32}$ in. holes 9 in. long are drilled at the rate of 2,000 per day by two operators using four six-spindle machines. Rods rotating at 2,500 r.p.m. are fed downward against a fixed single-flute drill through which oil is forced under 1,200 lb. per sq. in. pressure

Honing operation on cylinder bores of the eight-cylinder engine. Blocks for the 16-cylinder engine are honed in a similar machine

the relatively thin wall that remains around the hole after machining. The work is done in four special six-spindle machines designed by Cadillac engineers for this particular job. These four machines and a high-pressure pump with an accumulator, occupy a total floor space of perhaps 600 sq.ft. Two operators can drill about 2,000 holes per day, thus making rifle drilling a comparatively inexpensive operation.

Each machine is fitted with six drills having one straight flute and a small oil hole from end to end. The drills are held stationary and are clamped against a fitting connected to the accumulator line which supplies oil at 1,200 lb. per sq.in. pressure. The oil issuing from the point of the drill at this high pressure forces the chips downward through the flute of the drill. Each rod is clamped in its chuck in a vertical position and, turning at a speed of 2,500 r.p.m. is fed downward at the rate of 0.00055 in. per revolution against the drill. Each chuck runs in a separate compartment closed by a slide which prevents the oil from being thrown outside the machine while the latter is running. While the operator loads one machine the adjacent machine is drilling and stops automatically as soon as the holes are finished.

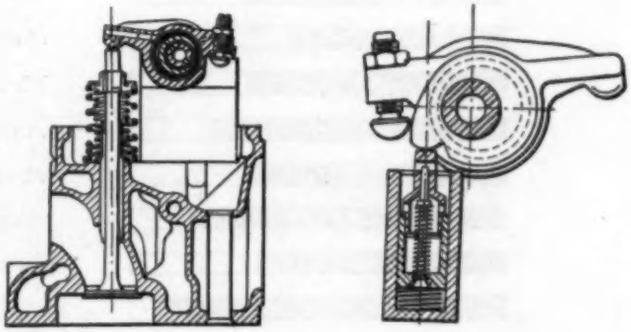
Pistons, which are of cast iron, are held within ±0.0002 in. of nominal diameter, and are fitted to the honed cylinders, 0.003 in. larger in diameter, by selective assembly. The selection is made by passing a tape 0.003 in. thick between the piston and cylinder wall at two diameters 90 deg. apart. The tape is pulled through with a spring balance which must not read less than 4 lb. nor more than 7 lb. When the pull is within these limits at both diameters the fit is correct.

Although the piston pin is held in the piston by a screw, both the pin and the hole are lapped and selected within 0.0001 in. to assure a perfect fit. If any high spots were allowed to remain they might hammer out in time as the engine is run and ultimately wear enough to make a slight play with consequent noise. In a product of this type, enduring silence is considered essential.

After the piston with its rings, pin and rod are assembled, the big end of the rod is slipped over a ball bearing spindle and the piston is allowed to rest upon a delicate scale. The weight thus recorded must come within $\frac{1}{64}$ oz. of the (master) standard weight. Slight variations in weight of the assembly are corrected by selecting from piston pin holding screws of eight different head thicknesses the particular screw that brings the weight of the assembly within the desired limit. After assembly parts are numbered to assure correct re-assembly later.

Crankcase castings, made in the Cadillac foundry, are cleaned with extreme care, by steaming and blowing out with air. Close machining limits are held on all important dimensions. One such dimension is that of the vertical surfaces or bearing locks which are used instead of dowel pins to position the bearing caps from side to side. The location of these surfaces are held within 0.001 in. of nominal and are given their final finish in a special broaching machine. After the bearing caps are bolted in place a roughing cut is taken with tungsten-carbide cutters in a boring bar. The finishing cut for the main bearing seats then is made with a diamond drill.

Several of the most exacting machine operations are those performed on the valve actuating mechanism, already referred to. Proper functioning of the automatic valve silencing device is dependent upon extreme precision of the parts, some of which are shown in accompanying drawings. Several of these parts are held within limits of 0.0002 in. and magnifying glasses are required in some of the inspection operations.



Sections through the Cadillac 16-cylinder engine head and valve silencer mechanism, the parts of which are held to extremely close limits

The bore of the eccentric take-up is ground and honed as is the cylinder into which the lapped plunger bearing against the eccentric arm fits. The small valve that is carried inside this plunger is not much larger than that of an ordinary tire valve. It is held to its seat by a very light spring yet must be capable of seating against a 1½-pound air pressure and is tested for leakage under this pressure. This valve has to seat against what is practically a sharp edge so as to cut through the film of oil always present upon the valve. The valve has to be ground to its seat with finely powdered glass in grease. This valve is turned out in an automatic screw machine and then is finish-ground all over in a centerless grinder.

Much of the assembling of the valve mechanism is done selectively to insure correct clearances.

AMERICAN MACHINIST 1930 INVENTORY

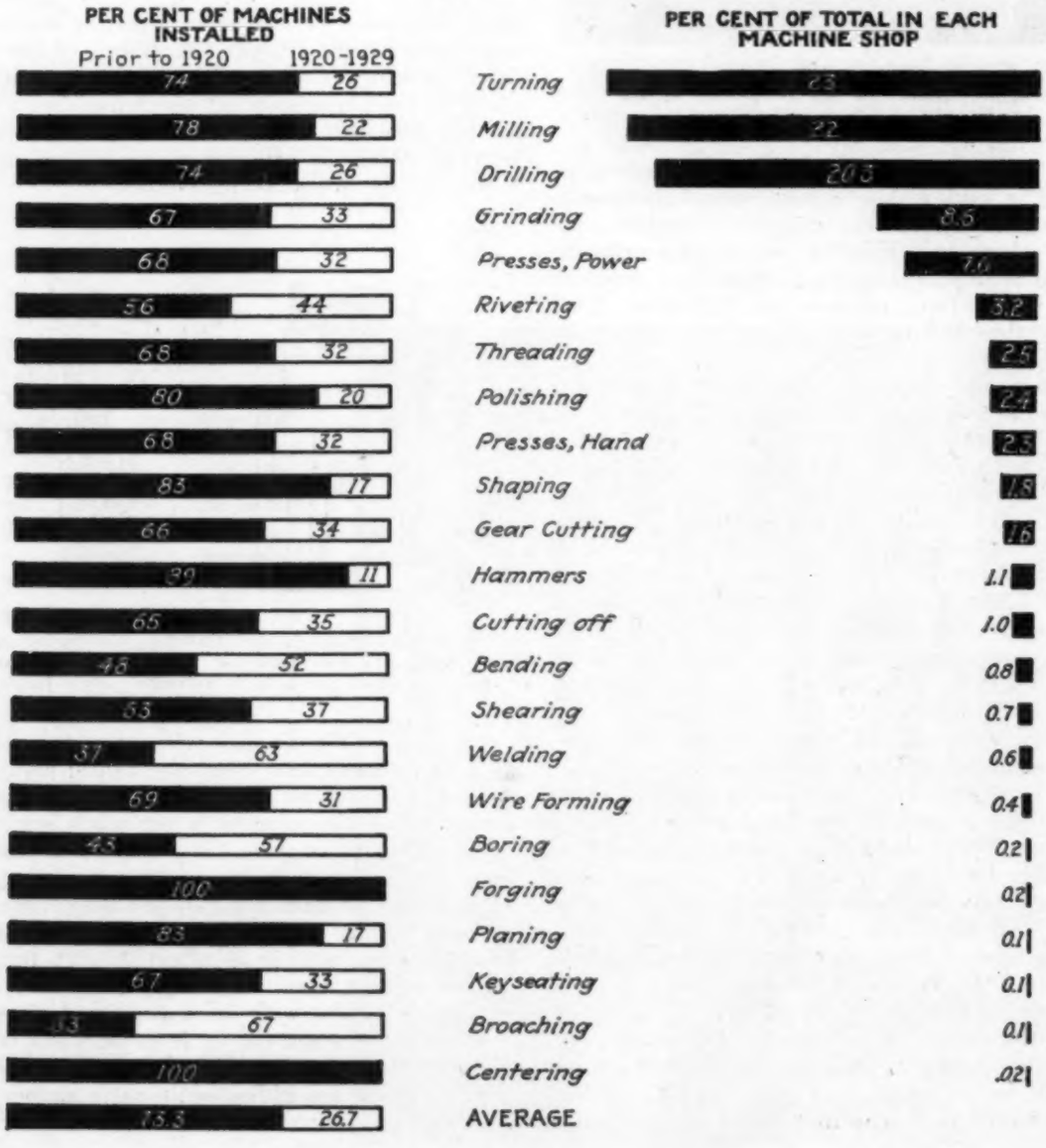
of Metal-Working Equipment

Report No. 3—Machines Used in Making Office Machines

AN UNFORTUNATE change occurred during the past five years in the percentage of metal-working machine tools more than ten years of age in the shops of typewriter, cash register, and calculating machine builders. Five years ago, in 1925, 33.6 per cent of the tools in cash register and calculating machine plants and 55.4 per cent of those in the typewriter plants were more than ten years old; now the combined percentage of the industries is 73.3.

As before, turning, drilling, and milling machines make up the largest percentage of the total. Cash register builders five years ago had 63 per cent and typewriter builders 52.3 per cent of their machine shop equipment in these three classes; the combined percentage now is 65.3. Drilling, which held a secure second place, has slipped to third place by more than three per cent, while turning and milling take first and second honors with 23 and 22 per cent respectively.

A definite need for modernization is suggested by these figures, which show that three of every four tools are over ten years old. Recent technical advances in tool building have kept pace with advances in office machine building, and new tool equipment in these fields will prove as salutary as it has in others.


PER CENT OF MACHINES INSTALLED
Prior to 1920
1920-1929
PER CENT OF TOTAL IN EACH MACHINE SHOP
Turning 74 26 23
Milling 78 22 22
Drilling 74 26 20.3
Grinding 67 33 8.6
Presses, Power 68 32 7.6
Riveting 56 44 3.2
Threading 68 32 2.5
Polishing 80 20 2.4
Presses, Hand 68 32 2.3
Shaping 83 17 1.8
Gear Cutting 66 34 1.6
Hammers 89 11 1.1
Cutting off 65 35 1.0
Bending 48 52 0.8
Shearing 63 37 0.7
Welding 37 63 0.6
Wire Forming 69 31 0.4
Boring 43 57 0.2
Forging 100 0.2
Planing 83 17 0.1
Keyseating 67 33 0.1
Broaching 33 67 0.1
Centering 100 .02
AVERAGE 73.3 26.7

Machines in Typewriter, Calculator, and Cash Register Plants

	Total Number in Plants 1930	Number Installed Before 1920
LATHES		
Engine	683	467
Hand Turret	45	15
Power Turret	171	37
Automatic and Semi-Automatic		
Chucking (Not Chucking Machines)		
Speed and Bench	1,677	1,380
Wheel, R.R.		
Axle, R.R.		
Crankshaft		
Toolroom Type	927	690
Other	134	119
CHUCKING MACHINES (Not Chucking Lathes)		
SCREW MACHINES		
Hand	556	490
Automatic, Single Spindle	2,047	1,495
Automatic, Multiple Spindle	794	475
CENTERING MACHINES	7	7
MILLING MACHINES		
Hand (No Power Feed)	1,335	1,083
Bench	586	564
Plain (Knee and Column Type)	2,707	2,247
Universal (Knee and Column Type)	378	267
Vertical (Knee and Column Type)	741	15
Lincoln Type Manufacturing	378	312
Continuous, Rotary Table or Drum, Type		
Planer Type	59	
Other	1,224	979
GEAR CUTTING MACHINES		
Rotary or Milling Type	326	237
Hobbing	119	67
Planing or Shaping	15	
Other	15	
BORING MACHINES		
Horizontal Boring, Drilling and Milling	15	15
Vertical Boring Mills	7	7
Other	7	
JIG BORERS	22	
DRILLING MACHINES		
Radial	15	
Upright, One Spindle	2,589	2,040
Upright, Two or More Spindles	3,056	2,270
Upright, gang (Two or More Heads)	22	
Sensitive, One Spindle	208	148
Sensitive, Two or More Spindles	178	37
Sensitive, gang (Two or More Heads)	52	52
Two, Three and Four Way		
Other	82	37
THREADING MACHINES		
Single Spindle Tapping	608	386
Multiple Spindle Tapping	7	
Pipe Threading and Cutting	52	52
Bolt Threading and Cutting	37	37
Thread Chasing	15	15
Thread Hobbing and Milling		
Thread Rolling	37	22
Other		
PLANERS		
Open Side	15	7
Double-Housing	30	30
SHAPERS		
Vertical	22	15
Horizontal	534	445
Slotters	7	7
KEYSEATING MACHINES	22	15
BROACHING MACHINES	22	7
GRINDING MACHINES		
Plain Cylindrical	326	267
Universal Cylindrical	186	126
Surface, Reciprocating	304	148
Surface, Rotating	82	30
Internal	37	7
Crankshaft		
Cutter	326	252
Floor, No Feed Attachments	230	186
Bench, No Feed Attachments	749	542
Abrasive Disk	208	171
Abrasive Belt	96	30
Centerless	30	
Other	67	22
POLISHING AND BUFFING MACHINES (Including those in Plating and other Depts.)		
Abrasive Wheel, Hand Operated	631	512
Abrasive Belt, Hand Operated	67	52
Automatic and Semi-Automatic		
LAPPING MACHINES	37	22
HONING MACHINES		
CUTTING-OFF MACHINES		
Parting Tool Type		
Power Hack Saw	178	119
Rotary Cold Saw	45	37
Bandsaw	30	22
Other	45	15
WIRE FORMING MACHINERY		
Spring Coiling	45	22
Other	74	59
WELDING AND CUTTING MACHINES		
Resistance Welding, Butt	15	15
Resistance Welding, Spot	134	37
Resistance Welding, Seam		
Resistance Welding, Other		
Arc Welding		
Electric Cutting		
Gas Welding	15	7
Gas Cutting	15	7
RIVETING MACHINES, STATIONARY		
Pneumatic		
Hydraulic	148	82
Power	846	475
PRESSES		
Punching Machines	1,424	1,009
Combined Punches and Shears		
Hand, Arbor	304	148
Hand, Light Punch Press Work	22	
Foot, Light Punch Press Work	364	319
Power, Crank Type	408	223
Power, Toggle Type	134	111
Power, Double Acting		
Power, Dieing Type		
Power, Trimming Presses		
Power, Forcing, Arbor, Wheel		
Hydraulic, Bending, Forming, Drawing		
Hydraulic, Wheel Forcing, etc.		
Baling, Power and Hydraulic	15	7
Other	126	82
BENDING AND STRAIGHTENING MACHINES		
Bending Brakes	67	7
Bending Rolls, Horizontal	89	67
Bending Rolls, Vertical	7	
Straightening Rolls	30	22
Other	52	22
SHEARS		
Knife	141	96
Rotary, Slitting	30	30
NIBBLING MACHINES	52	5
HAMMERS		
Drop	178	141
Helve	96	96
Spring	67	67
Steam	7	7
Pneumatic (not portable)		
Other		
FORGING MACHINES		
Bulldozers		
Hot Forging Machines	7	7
Cold Headers, Bolt, Nut, etc.	14	14
Cold, Swaging	45	45
Forging & Flanging Presses, Hydraulic		
Other Forging Machines		
Total	31,230	22,374

IDEAS FROM PRACTICAL MEN

Piercing Material of Two Kinds

WALTER WELLS

IN A particular piercing operation, through the covering of a box camera, there was no choice but to have the piercing punch work from inside the box, outwardly. The covering consisted of imitation mottled-leather glued to soft cardboard. The punch would have to strike the cardboard first. A punch and a die made in the customary way would not cut cleanly through the material. The soft cardboard comprised about four-fifths of the total thickness of the material, so that when an ordinary punch, after having ploughed through the cardboard, attacked the rather crisp imitation leather, it could not pass through it without pulling out the thread fibers of the material.

This pulling out of the threads was not permissible, because there was no ferrule to be set in the hole to cover the raw edges of the material. After many trials and changes, and the shamefaced use of a pair of scissors, the original tools were scrapped and others of a new, rather odd design were adopted.

In Fig. 1 is shown the principle of the cutting action

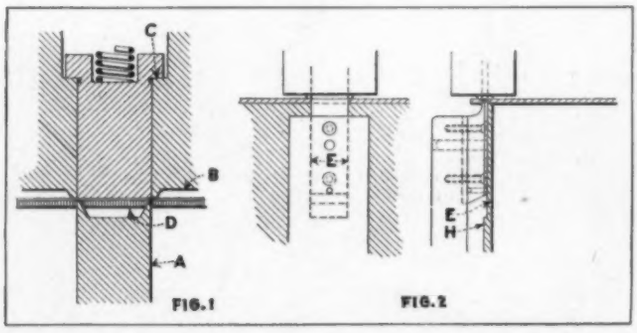


Fig. 1—Construction of the punch and the die. Fig. 2—Camera box in position for piercing the hole

of the tools. In Fig. 2 are shown, first, the reason for the punch being on the cardboard side of the covering; and second, the cause for the inversion of the punch and the die. In the section in Fig. 1, it will be seen that the punch *A* is the fixed member. The die proper, with the cutting edges crowned, is shown at *B*. At *C* is a soft-steel bumper that is a sliding fit in the die, and is firmly sprung against the shoulder stop. The punch is recessed, so that a cutting angle of 30 deg. is formed on each of the four edges, matching at the corners. This angle, plus the crown on the die and the resistance of the bumper to the cut, accounts for the non-tearing action of the tools. The punch simply elbows the soft cardboard aside to get at the woven material. The crown on the die being slightly flattened, irons out the mottles on the imitation leather, while the bumper co-operates with the punch in the first phase of its work. The shading at *D*, Fig. 1, shows how the cardboard is thrust aside by the punch. The stiffer part of the stock scrap acts as a shield between the punch and the bumper.

In Fig. 2, with only part of the camera box drawn in section, is shown a corner of the box to be pierced. The piercing is actually 0.563x0.070 in. At the top can be seen the cardboard and the imitation leather. At the side, near the open part of the camera box, is a wooden partition in which there is a half-slot that must be in line with the pierced hole. See *E* in both views. The punch and its holder must have clearance to fit into the half-slot. The camera box is brought into position, the half-slot is located over the flat side of the punch (provision having been made for bringing the box up squarely), and the foot press is kicked by the operator. The punch proper is made in two parts to permit ease of making and resharpening. The section in the view at the left, in Fig. 2, is made along the outer face of the partition to show how the punch is located in the half-slot. See the shoulder at *H* in the view at the right.

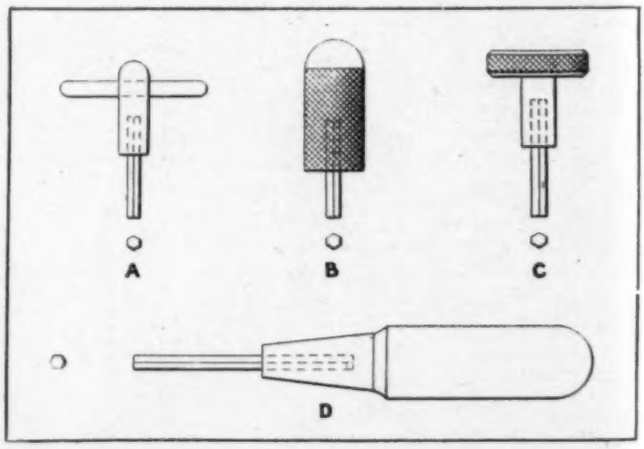
The punch was inverted, not to ease any cutting action, but to obviate frequent stripping, wihch had occurred with the former tools, and which made a tough problem tougher.

The camera box, held in two hands, seems to have afforded the operator too much leverage. Originally, the shank on the punch was exceptionally long, which multiplied the play caused by the slight looseness of the press ram in its guides. To prevent the tendency toward stripping the punch, the punch holder was tightly clamped down on a pair of parallels. From resharpening every three days, and making new punches after each second resharpening, getting clean runs of 50,000 was quite an improvement.

Convenient Wrenches for Safety Setscrews

C. H. HAYS

Our assemblies require large quantities of small-sized safety setscrews, and the standard wrenches furnished with screws of this type are rather inconvenient for fast assembling. To overcome this objection, we cut the



wrenches to various lengths and mount them in different kinds of handles, as shown by the illustration.

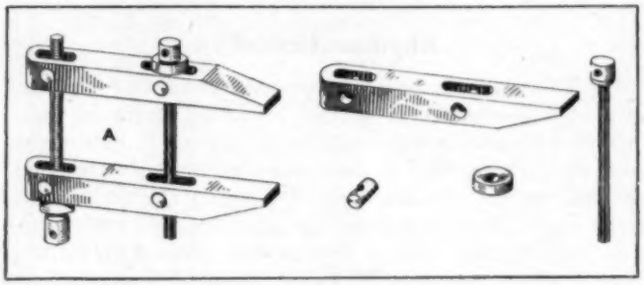
At *A* is a key-type wrench, this type being used on larger sizes of screws. At *B* and *C* are two convenient types for use on small screws. At *D* is a screwdriver type of wrench. It is easy to use and does not tire the worker. The various types of wrenches shown in the illustration work out very satisfactorily if they are made in proportion to the screws on which they are to be used, so that the proper leverage may be secured with the minimum amount of effort.

■

Toolmakers' Clamp for Uneven Work

CHARLES H. WILLEY
Asst. Plant Supt., Hoyt Electrical Works

While numerous types of toolmakers' clamps have been described from time to time, most of them could not be used on surfaces that were much out of parallel without straining the screws. The clamp illustrated is self-



aligning and can be used for clamping work, the surfaces of which present quite an angle.

The assembled clamp is shown at *A*, while at the right may be seen most of the component parts. The pivot action of the joints permits the jaws to align themselves on work that is out of parallel.

■

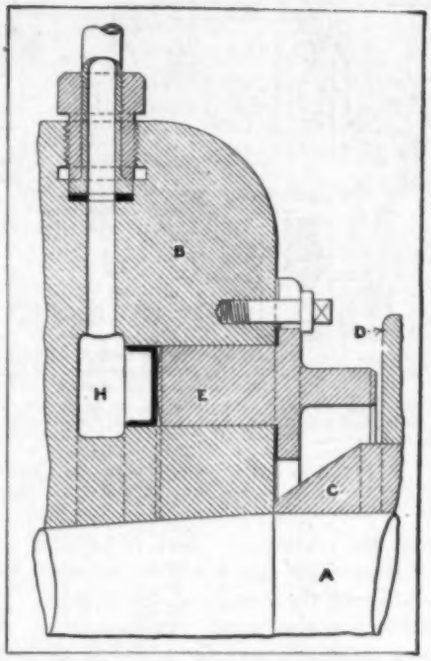
An Integral Forcer

J. T. TOWLSON
London, England

In the case of the device about to be described, the word integral is intended to imply that the means for removing a ship's propeller from its shaft is incorporated in the propeller itself.

Referring to the illustration, *A* is the propeller shaft, *B* is the propeller hub, *C* is the shaft liner, and *D* is the face of the keep-plate of the shaft bearing. A section of an annular ram fitting in an annular groove in the propeller hub is shown at *E*, while at *H* is a counterbore at the inner end of the annulus. Between the inner end of the ram and the counterbore is a cup packing to prevent leakage of fluid under pressure. A pipe for the pressure supply is in line with a hole leading to the counterbore, and through it to the cupped packing and the ram. The pipe is flanged at the lower end, is held in place by a threaded gland and is made tight by a gasket below the flange.

In operation, fluid under pressure is brought through the pipe to the counterbore, from which it enters the cupped packing, forcing the packing against the ram. The ram is thus forced outward and against the keep-plate. Since continued application of pressure can move the ram no farther, the result is that the propeller is moved lengthwise of the taper on the shaft, from which it is loosened and can readily be removed. The ring forming the end of the ram toward the keep-plate is cut away, leaving four projections, or horns. Visual inspection of the shaft bearing can be made through the spaces between the horns. It will be observed that the enormous area of the ram subject to pressure, provides tremendous power toward starting the propeller from its shaft.



Device for removing ships' propellers

Before the ship goes to sea, the underside of the flanged head of the ram is made tight with joint cement, and is held against the end of the propeller hub by collar screws of Muntz metal. The gland and the pipe are replaced by a plug, and the counterbore and all spaces in the hub are filled with oil.

■

How Kinner Uses Process Drawings

FRANK A. STANLEY
Consulting Mechanical Engineer

Crankshafts in airplane engines play a vital part in the success or failure of the power plant. Material, tool marks, fillets and heat-treating are all important as well as accurate dimensions and fits of bearings. The Kinner crankshaft, shown in Fig. 1 with a few typical dimensions, is of single-piece design, forged from alloy steel, heat-treated, and ground. It is carried on combination ball and babbitt bearings, the ball bearings taking the thrust. The crank cheeks are extended and tapped for attaching counterweights. A study of the tolerances required as shown in Fig. 1 will be of interest.

Four of the process drawings grouped in Fig. 2 show

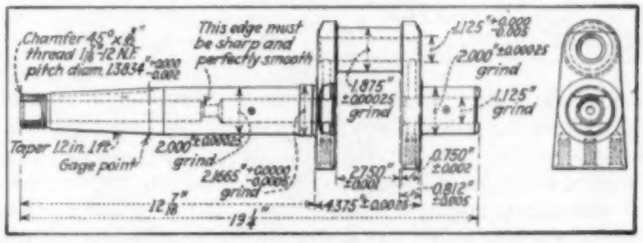


Fig. 1—Details of finished Kinner crankshaft with main dimensions and tolerances.

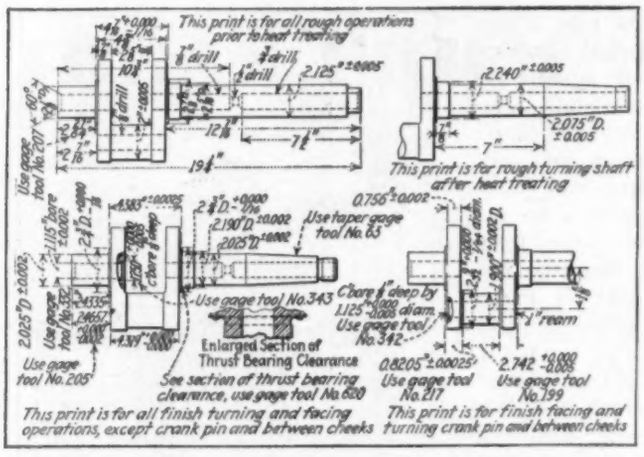

This print is for all rough operations prior to heat treating
This print is for rough turning shaft after heat treating
This print is for all finish turning and facing operations, except crank pin and between cheeks
This print is for finish facing and turning crank pin and between cheeks
Use taper gage tool No. 63
Use gage tool No. 343
Enlarged Section of Thrust Bearing Clearance
See section of thrust bearing clearance, use gage tool No. 620
Use gage tool No. 342
Use gage tool No. 217
Use gage tool No. 199
Use gage tool No. 205

Fig. 2—Four process sheets, each showing just what is to be done in different operations.

how the crankshaft work is handled in the shop. Sheet *A* shows the operations to be done before heat-treating and gives the roughing dimensions. The closest dimensions are the crank cheek widths, where $\frac{1}{64}$ is given as a tolerance and the O.D. of the shaft is held to plus of minus 0.005 in. Sheet *B* is for rough turning after heat-treatment, and again the tolerance is 0.005 in.

Most of the finish turning and facing operations are shown on sheet *C*, and here the main tolerances have been reduced to 0.002 in. In sheet *D*, the remaining operations are shown, these leaving only sufficient material for grinding.

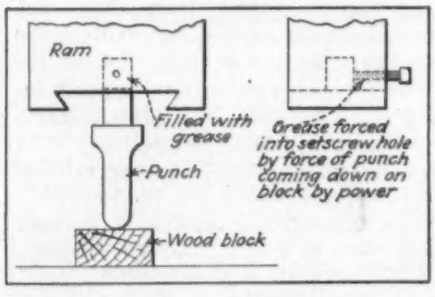
The use of such process sheets gives the workman in each department definite instructions only as to the operations he is expected to perform. By putting the operations on different process sheets, there is no confusion as to dimensions.

■

Removing a Jammed Setscrew

STANLEY PIVONSKI
Toolroom Foreman, Anchor Post Fence Company

A setscrew in the ram of our press became jammed, so that we could not screw it in to tighten the punches, neither could we get it out. By using a wrench with an extension, we were able to wiggle the screw a little, but not enough to get a full turn. Finally, we were able to get the screw loose by the following method:



We filled the hole for the punch nearly full of grease, and then entered the shank of a punch in the hole. A block of wood, somewhat higher than the distance between the lower end of the punch and the bolster, was placed under the punch. Then we started the press. After the punch had bumped the block several times, the grease was forced into the threads of the screw and the hole, lubricating them both. We were then able to get the screw out by using a wrench of ordinary length. The illustration shows the scheme.

SEEN AND HEARD

●

Rhythm Helps

RHYTHM plays a part in securing the best results in many kinds of work. In lifting railroad rails, in track construction, and in similar work, it is essential that all the crew lift at the same time; signals from a leader are important. These signals are frequently woven into some kind of a simple chantey or song. The same thing holds in far off Korea where about two dozen husky women furnish the motive power for a primitive pile driver. The drop or "tup," is suspended from a tripod or "shears" made of poles of sufficient length and size. About two dozen ropes lead to a single main rope that goes over the pulley at the top of the triangle. At the proper time, given by the rhythm of the song of the leader, the women pull together, raise the tup and let it fall on the pile to be driven. —*J. R. G.*

Rhythm Hinders

WHAT seemed to be a misapplication of this rhythm idea was observable in several cities in Japan in connection with excavation or street paving work. Here the same idea was applied to men with a pick who were lined up four or six abreast and who raised the picks at a given signal, held them poised in air until the next signal, and then let them fall as though they were automatons. This, however, seems to be a case where individual effort rather than uniformity of motion, would secure best results. A small, short man would have a different natural motion than that of a tall man of large frame, and where combined or rhythmic effort is not necessary it seems as though the individual should be free to work as he chooses, always admitting that he must not interfere with the others and that his work must equal in both quality and quantity, the average of the gang. It takes practical experience and good judgment to know when to apply the right method, for no one method is best for all conditions. —*J. R. G.*

Sheet versus Strip

FOR many months Chevrolet has been making radiator shells from brass strip stock with very little waste. Ford chose to stamp shells from rustless (high-chromium) sheet, using part of the stamped-out center for headlight and other parts, but accumulated large quantities of scrap for which no satisfactory market had been found the last we heard. Serious production difficulties also were encountered in drawing this steel as well as in polishing it satisfactorily. Chevrolet did not escape polishing problems and in addition had chromium plating to do.

Reports now indicate that Ford is shifting to strip stock about 6 in. wide and 0.025 in. thick for radiator shells, but adheres to the use of nickel-chromium steel which, of course, requires no plating. Production economies are anticipated. It will be interesting to learn which combination of operations and material proves to be most economical. When two industrial giants wrestle with problems so important as these, side-line spectators are likely to get a great kick from looking on. —*N.*

Heat-Treating Tables

Thermometer Fixed Points and Drawing Bath Mixtures

FIXED POINTS FOR THERMOMETER CALIBRATION COMMONLY USED IN THE HEAT-TREATING DEPARTMENT

Substance	Point	Temperature	
		Thermo F°	Scale C°
Alcohol, ethyl	Boils	173.0	78.3
Aluminum, (Al) pure metal	Melts	1218.0	658.7
Antimony (Sb) pure metal	Melts	1166.0	630.0
Barium (chloride) ($BaCl_2$) salt	Melts	1760.0	960.0
Benzene	Boils	176.0	80.0
Cadmium (Cd) pure metal	Melts	624.2	320.9
Cobalt (Co) pure metal	Melts	2696.0	1480.0
Copper (Cu) pure metal	Melts	1983.0	1083.0
Glycerine	Boils	554.0	290.0
Gold (Au) pure metal	Melts	1945.4	1063.0
Iron (Fe) pure metal	Melts	2912.0	1600.0
Lead (Pb) pure metal	Melts	620.0	327.0
Mercury (Hg) pure metal	Solidifies	173.0	78.5
Mercury (Hg) pure metal	Boils	675.0	357.3
Nickel (Ni) pure metal	Melts	2645.6	1452.0
Platinum (Pt) pure metal	Melts	3191.0	1755.0
Potassium Nitrate (KNO_3) salt	Melts	642.0	337.0
Silver (Ag) pure metal	Melts	1769.0	960.5
Sodium chloride (NaCl) salt	Melts	1481.0	805.0
Sodium Nitrate ($NaNO_3$) salt	Melts	593.6	312.0
Sodium Sulphate (Na_2SO_4) salt	Melts	1623.2	884.0
Sulphur (S) amorphous	Boils	833.0	444.7
Tin (Sn) pure metal	Melts	450.0	232.0
Tungsten (W) pure metal	Melts	7052.0	3400.0
Water, distilled	Boils	212.0	100.0
Zinc (Zn) pure metal	Melts	786.2	419.0
Lead 35% / Tin 65% — Lowest melting alloy of these two metals	Melts	358.0	181.0
Sodium chloride 45% / Sodium sulphate 55% — Lowest melting mixture of these two salts	Melts	1154.0	623.0
Sodium Nitrate 50% / Potassium Nitrate 50% — Lowest melting mixture of these two salts	Melts	424.0	218.0

DRAWING BATH MIXTURES

Material		Melting Temp.	Range	Remarks
67% $NaNO_3$	33% KNO_3	450°F.	500–1000°F.	
50% $NaNO_3$	50% $NaNO_2$	350°F.	355–1000°F.	
100% NaCl		1510°F.	1515–1830°F.	Fumes destructive to Fire Clay
	100% Na_2SO_4	1535°F.	1545–1830°F.	Na_2SO_4 destructive—use metal pots
77% NaCl	23% Na_2SO_4	1340°F.	1350–1830°F.	Fumes not to come in contact with Fire Clay
50% NaCl	50% Na_2SO_4	1157°F.	1170–1650°F.	Lowest melting salt mixture
27% NaCl	73% Na_2SO_4	1365°F.	1375–1740°F.	Not corrosive to metal
100% KNO_3		650°F.	655–1200°F.	Decomposes before boiling
	100% $NaNO_3$	590°F.	600–1200°F.	Do not overheat
78% KNO_3	22% $NaNO_3$	490°F.	500–1290°F.	Good temper bath
54% KNO_3	46% $NaNO_3$	430°F.	435–1200°F.	Lowest melting salt mixture
23% KNO_3	77% $NaNO_3$	545°F.	555–1200°F.	Overheating breaks up salt
100% Sb		1170°F.	1180–1470°F.	Cover metal with charcoal
	100% Pb	620°F.	630–1290°F.	Oxidizes rapidly if overheated
35% Sb	65% Pb	750°F.	760–1290°F.	Good for normalizing
13% Sb	87% Pb	475°F.	485–1290°F.	Lowest melting alloy
55% Sb	45% Pb	930°F.	945–1380°F.	Lighter in weight than lead

Courtesy of Heppenstall Company

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Buying Machine Units Instead of Making Them

BUSINESS methods change as well as shop practices. A few years ago the larger automobile plants built most of the parts that entered into the car. Some few made their own carburetors and starting motors. Saving small manufacturer's profits was supposed to reflect greater value per dollar to the buyer.

Now there is a trend in the other direction. Many who build their own engines buy pistons or piston pins, or both. Some buy crankshafts, either partly or completely finished. And both carburetors and electrical apparatus are bought from specialists.

Comparatively few car builders now make their own transmissions. Machine equipment formerly devoted to this work has been modified, scrapped, or in one case at least, sold to the firm which took over the contract. Axle units and brakes are also frequently bought ready for assembly, and by concerns whose product does not come under the classification of assembled cars, in any sense. More and more assembling of standardized parts is being done every year. In some instances units are designed for a particular car builder. But in most instances the differences are slight.

These changes in policy force us to look at the problem more carefully than ever before. The mere fact that large car builders are buying units from outside is a clear indication that it is cheaper.

How far is this practice likely to extend to other industries?

Parable

A MAN came to buy. Armed with many a sound dollar, he planned to refill his stores while prices were at rock bottom. To his notion any business movement was bound to be up.

Said the first super-salesman approached, "Business is just terrible. I'll beat any price you can find in the trade."

"Good day," said the man and departed with his dollars intact.

Said the second super-salesman approached, "Business is just terrible. I'll beat any price you can find in the trade."

"Good day," said the man.

Said super-salesmen three, four, and five, "Business is just terrible . . . ." but they did not have to finish their super-sales-talk because the man already knew all they had to tell him and sell him, and he was on his way—his dollars still intact.

Expansion and Over Capacity

EVERY industry manufacturing a popular product has its period of great expansion. This was true of the sewing machine, the locomotive, the bicycle, the typewriter, and is especially notable in the remarkable growth of the automobile. The present condition of the industry indicates that the existing capacity is larger than necessary for even a normal business. It is probably sufficient for the normal demand for several years to come. And there are even some rumors of newcomers in the field.

Somewhat similar expansion is taking place in the field of domestic refrigeration. A large plant is being constructed to have a capacity of two thousand units a day. Machinery especially equipped for the various parts is being built and some of it is already installed, this plant forming one of the few bright spots in the machine tool market at present.

One of the results is a lowering of prices in competing machines, anticipating a reported cut in the price of the new units. Builders already established, with development charges written off the books and a reputation on which to build future sales, should be in an excellent position to meet competition. But over-expansion is not good for any industry nor is it economically sound to tie up large excess capital in plants that cannot be kept producing on a profitable basis.

It is a difficult problem, however, to say when expansion should stop. There are cases in the automotive industry where aggressive managers have built a large business from the ruins of a former company. So, while we know that over-expansion is uneconomical, who is to decide when the limit has been reached?

SHOP EQUIPMENT NEWS

Grob No. 1 Continuous Filing Machine

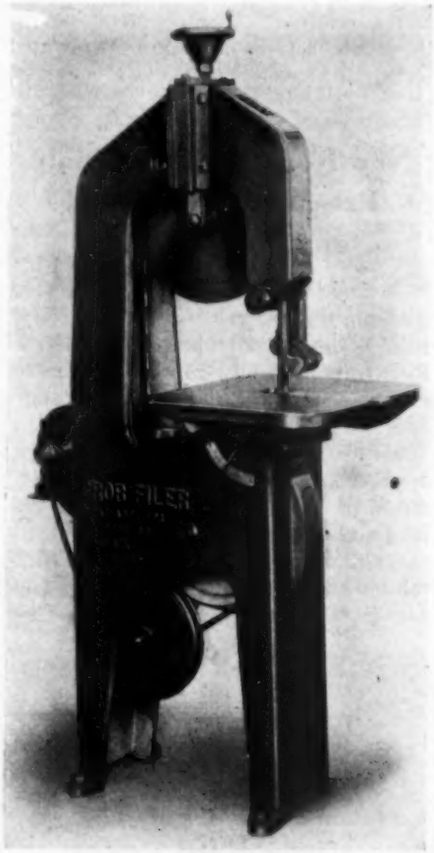
TO MEET the demand for an accurate filing machine for use in connection with the manufacture of dies, special tools, and miscellaneous parts requiring filing, as well as for general maintenance work, Grob Brothers, 90th and National Aves., West Allis, Wis., have developed and are marketing a continuous type filing machine, known as Model No. 1. One of the features of the machine is the speed and ease with which filing can be done, inasmuch as the cutting action is continuous.

Among the applications of the machine is that for the filing of parts having internal holes, such as blanking and trimming dies. When work of this type is encountered it is only necessary to disconnect a notched link of the file chain, done by releasing the tension adjustment and withdrawing a connecting pin. The die to be filed is placed in position on the table, and the filing chain is drawn through the hole of the die and again connected by attaching the notched link pin and tightening the tension of the filing chain by adjustment of the handwheel at the top of the machine head.

The frame is a semi-steel casting, to which the table, the front guard and slide, and drive units are attached. The bracket at the rear of the frame supports the motor. The 16x20-in. filing table is mounted on the frame by means of two hinge-pins, arranged so that the table can be tilted in either direction to a total movement of 22½ deg. either way.

Tilting of the table is done by releasing a nut, located on the end of the left-side hinged pin, which in turn releases the binding pressure. An indicator finger, attached to the table, together with a graduated plate mounted on the side of the frame, provides a positive means of setting the table to any desired angular position.

The continuous file chain is made of a series of links operating on two sheaves, one located in the base of the machine and acting as the driver, while the other is located in the head and acts as the idler. Adjustment to compensate for filing tension is attained by operation of the handwheel located on top of the head. A heavy helical spring maintains the proper tension and acts as a cushion to maintain a uniform drive. Links to which the files are welded can be replaced by removing two pins. A change from one filing chain to another can be made easily. Either flat, half



round, or specially formed filing chains can be used.

The filing chain is driven by means of a Tex-rope reduction drive. The motor pulley, through a belt, drives a countershaft, which in turn drives the lower sheave of the chain drive through a second belt. The countershaft is so mounted that when pressure is applied to the filing chain, a torque is developed which causes the driving belt to tighten. Thus, any additional pressure applied to the face of the files causes the tension of the driving belt to increase and thus forms a more positive drive.

Three speeds are obtained by means of a three-step drive pulley attached to the motor. The lowest speed is 170 ft. per min., the intermediate is 195, and the high speed is 220 ft. per min.

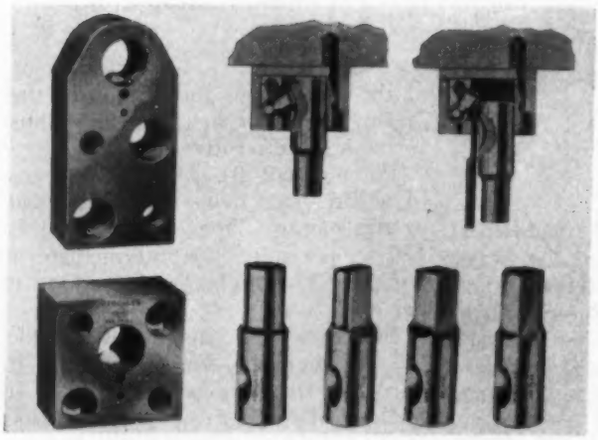
The back slide, against which the links of the filing chain operate, is of hardened steel and is replaceable. It is attached to the frame by two bolts. An adjustable slide which permits taking up any gap that may exist between the filing table and the filing chain is mounted on the table. This adjustment is required when the table is tilted. The guide that supports the filing chain can be adjusted to suit the height of the work being filed, thus insuring solidity.

Over-all height of the machine is 61 in. The total weight uncrated is 400 lb., and the approximate floor space required is 12x19 in.

Hercules Interchangeable Punches and Retainers

A system of interchangeable punches and retainers is being introduced by Whitman & Barnes, Inc., Detroit, Mich. The principal advantage claimed is that it is not necessary to remove the die from the press to change punches. Other advantages claimed are lower die building costs, easier and quicker set-up, reduced "down-time" for die repairs and elimination of time lost through broken punches, lowered die maintenance costs, and stabilized and increased production.

The Hercules interchangeable punch system consists of a removable punch held in a retainer by a detent acting in an arcuate recess in the shank of the punch. The punch is released instantly when the detent is pushed upward out of the recess by an extractor pin working through the retainer block. Thus punches are replaced quickly and easily much the same as a drill in a drill press. The detent in the retainer has liberal surface contacts at both ends. Because of the minimum working action set up between the detent and the punch, successive punching and stripping



forces will not cause the punch to stick or the retainer to split. The detent, in addition to supporting the punch, also takes out all possible longitudinal movement, thus keeping the punch in perfect contact with the backing plate at all times. In the operating position it transmits the stripping strain from the punch to the retainer through a line that is at 60 deg. to the axis of the punch. The result is that for every 100 lb. of stripping strain introduced when the punch is removed from the metal only 200 lb. transverse strain is transmitted to the retainer through the detent.

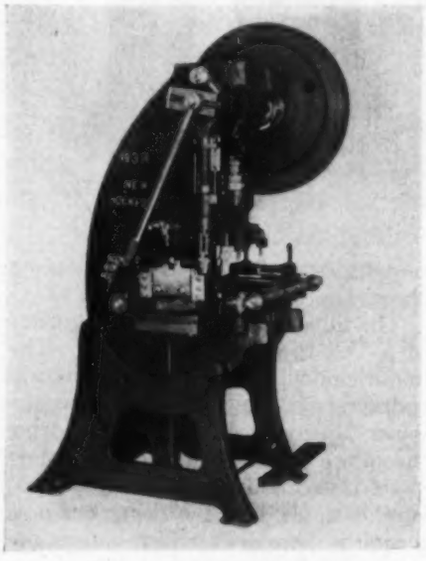
The punch retainers are made in square and rectangular types to take punches of sizes most commonly used in standard punch practice. The square type retainer is used wherever space and center distances permit. Closer center distances are obtained by combining the square with the rectangular type or by using the rectangular type exclusively. Punches are made and stocked in common-use sizes in round, oblong, square, and hexagonal piercing points. Punches and retainers are made to precision limits with all important surfaces ground after heat-treating. The tolerance on the diameter of the punches is plus 0.000 in., minus 0.001 in., and the back taper is from 0.001 in. to 0.002 in. in length of the piercing end. A vanadium punch steel is used for the punches and the best carburizing steel for the retainers.

This punch system is claimed to be applicable to practically all power punching operations. Retainers mount on standard die sets and the punches are aligned with regular die buttons. The set-up is relatively simple.

Where it is necessary to use a spring stripper plate it is essential that a clearance hole for the body or shank of the punch be located in the plate for each punch, so it can be removed through the stripper. This eliminates the necessity of removing the stripper plate to change a punch. A clearance hole must also be drilled through the stripper plate for the extractor pin, this hole to be aligned with extractor hole in the retainer. The construction of these die sets is apparent from the sectional views.

"New Rockford" Inclinable Press with Roll Feed and Scrap Cutter

A double roll feed and scrap cutter with automatic release for the feed rolls is now available for the "New Rockford" heavy-duty inclinable presses currently described on page 373, Vol. 73, of *American Machinist*. The illustration shows the attachment applied to a No. 3R machine. In addition to the automatic release for the feed rolls, the press is also fitted with an automatic release brake which releases when the press is started and grips when the press is stopped. This intermittent brake is operated by a toggle mechanism which can be seen in the illustration just under the inclined rock bar for operating the scrap cutter.



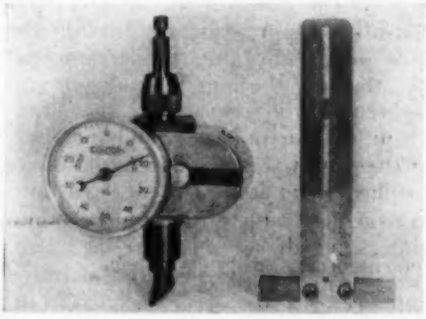
"New Rockford" Inclinable Press with Roll Feed and Scrap Cutter

The feeding attachment will feed at a rate up to 6 in. per stroke, but it can be adapted to feed longer lengths if desired. Because it is of the friction ratchet type, very fine adjustments of the feed are possible. Adjustment is also available for the scrap cutter in order to cut the scrap at the most suitable point.

In other respects, the machine is identical with those of the standard Type R series.

Comtor Amplifying Rod Gage

Recent developments in methods of sizing external diameters to accurate actual sizes of precision gage block stacks have raised the possibility of producing interchangeable products and fits if large cylindrical bores could be produced to equal precision of actual diameter. In attempting to meet this need, the Comtor Company, Waltham, Mass., has produced the Comtor amplifying rod gage. In this amplifying rod gage, continuous dial reading has been substituted for the try-and-try process with the micrometer. The flat cross-head, shown on the lower gage contact, keeps the gage in the transverse plane, or square with the bore being measured. It thereby removes one of the two elements which combine to cause delay and difficulty in getting a correct reading. The other end of the gage is moved circumferentially for the highest reading, which is the correct diameter of the bore. The suspension bar shown at the right may be used for greater ease, speed, and certainty when the bore is in a vertical position. The cross-head of the



gage seats loosely in one of the slots. This suspension bar then serves the triple purpose of anchoring the contact against slipping on the wall of the cylinder, supporting the weight of the gage, and aligning the cross-head with the cylinder. One suspension bar serves for all diameters, and may be slotted at different depths, as shown, or may be made to slide and clamp in any position of its T-head. The amplifier is of standard Comtor rackless construction, in which the early steps of amplification are by hardened tool steel involute surfaces, giving proportional readings.

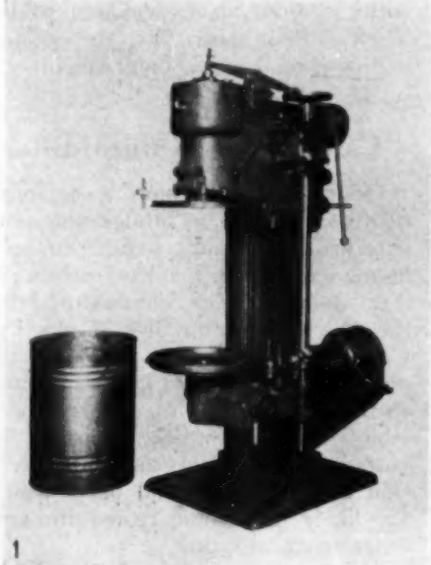
Bliss No. 220 Double Seamer

A semi-automatic double-seaming machine for round drums, pails, tubs, and similar articles having a diameter not in excess of 22½ in. and not over 18 gage in thickness has been produced by the E. W. Bliss Company, Brooklyn, N. Y. The compact design with a simple mechanism train is indicated in the illustration. Antifriction bearings and the splash system of lubrication have also been introduced.

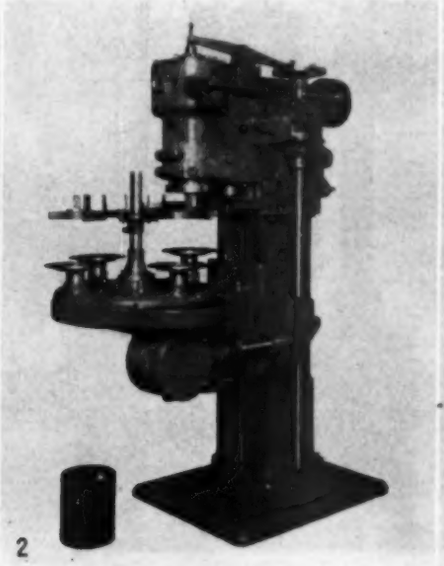
The machine comprises a self-contained seaming head bolted to a column which has a machined front face to which may be gibbed the footstock or work-holding knee. The head is a single box casting carrying the work spindle, driving shaft, and roll slides, together with the automatic feed mechanism for the latter. By this construction all strains occurring in seaming are contained in the one-piece head. All fast-running shafts are mounted on ball or roller bearings. Drive shaft and feed mechanism are oiled by splash while the work spindle, Timken mounted, is grease packed and fed from a cup. Cams and worm gears run in oil. The cams operate a pair of steel feed levers at the back connected to slides by long ball screws which provide convenient adjustment. Slides are machined and surface ground. In addition to the usual guide these slides have their top faces and the upper part of the side faces guided all the way out to the spindle. Rolls are of specially selected steel, double grooved for double life and run on Timken bearings. The work spindle is mounted in a quill to allow the small vertical adjustment necessary to bring the chuck to the level of the seaming rolls. When set the quill is clamped securely by two bolts in the split quill housing. Spindle nose is flanged and has four tapped holes for securing the chuck. It also has a 2-in. chuck centering pilot which takes the roll pressure. At the right of the head is a vertical splined shaft for actuating the various work holding devices and a handle for tripping the feed clutch. The latter is omitted on dial fed machines. A system of change gears which gives a range of 5 to 16 turns of the spindle for the first seaming roll and proportional differences in the time for the entire cycle have been provided to take care of diversified production requirements which has also led to the development of three types of feed.

Type A has a single-spindle footstock. This is the simplest form of the machine and it is the easiest to change from one job to another and is therefore best adapted to limited production. It is preferred for large thin drums which require careful assembling of body and head. A screw-elevated knee is gibbed to the column. This affords full adjustment for height and for vertical pressure to drive the work. The footstock spindle is flanged and piloted similarly to the upper one. It runs in a vertically slidable quill upon a ball thrust bearing, the latter being spring mounted to compensate for small variations in the height of the work. The footstock quill gets its vertical motion from the pinion shaft extending to the right. At its end there is a sprocket carrying a chain attached to the treadle. If any change in the location of the footstock is to be made, the operator lifts the chain off the sprocket, sets the footstock and then puts the chain back in whatever place gives the best treadle position. No tools are needed. This model will take work up to 22½ in. in diameter x 36 in. high and 18 gage in thickness.

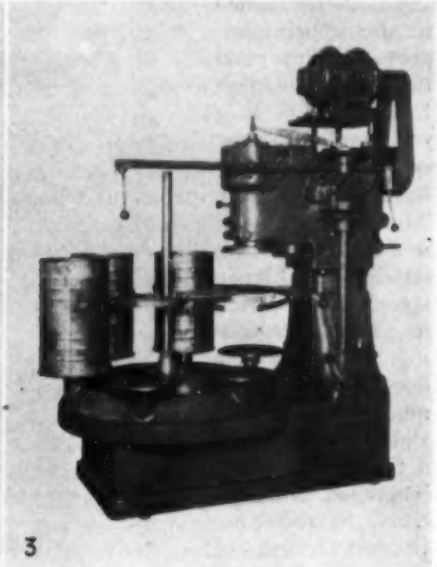
Type B has a four-station dial feed which will take work up to 15¼ in. in diameter x 26 in. high. Dial index-



1 Type A Double Seamer



2 Type B Double Seamer



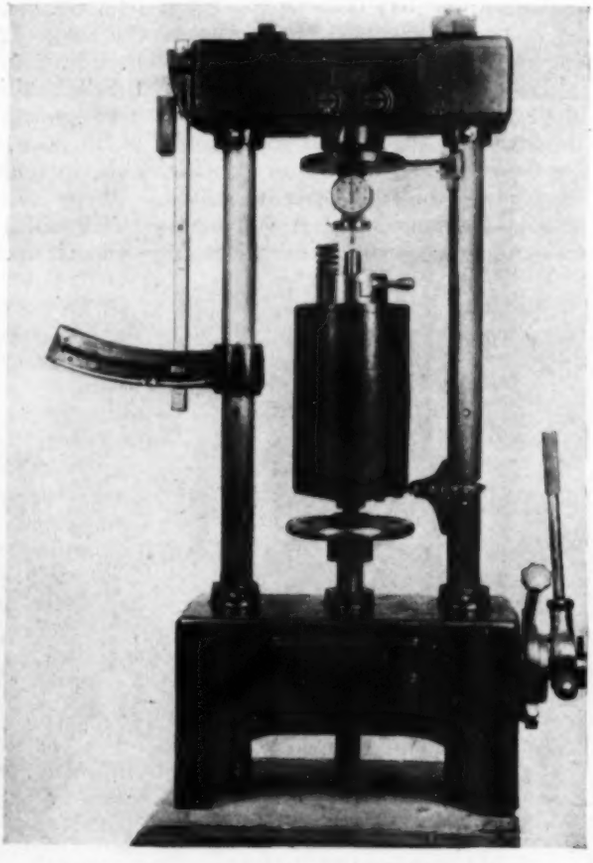
3 Type C Double Seamer

ing and rise and fall of work are automatic. Since the machine runs continuously, treadle and feed clutch are omitted. The entire dial mechanism is contained in a knee gibbed to the column and fitted with an elevating screw which gives the entire range of height adjustment. This machine will handle 12 to 16 heads a minute.

Type C has a dial for drums up to the full swing capacity of the machine. With a four-station dial it takes 22½-in. diameter work and with a six-station dial, shown in the illustration, it takes work up to 18 in. diameter. The height range is from 18 to 36 in. Large work is done on a dial which is built into the base and has therefore a constant height. It is not uncommon for such machines to be set with the bottom chucks flush with the floor for convenience in handling or for connecting up with a conveyor system. The height range is obtained by mounting the head on a vertically adjustable column. The machine is driven with a motor mounted on the head and with a Texrope or similar drive as indicated. The dial indexes at the rate of 12 a minute.

Coats Dial Micrometer and Spring-Loading Fixture

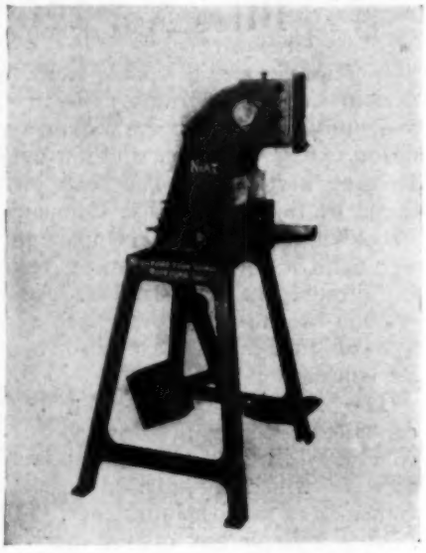
A dial micrometer and spring-loading fixture designed for testing hard, closely-wound springs is being marketed by the Coats Machine Tool Company, Inc., 110-112 W. 40th St., New York City. When compression springs of this type, which carry a load of 1 lb. for each 0.001 in. compression, are to be tested, the length scale graduated in $\frac{1}{16}$ in. shown alongside of the right-hand supporting pillar of the machine in the illustration is entirely inadequate for taking really accurate readings. For such tests, the dial micrometer and holder attached to the upper compression plate and the spring-loading fixture held in a recess of the lower compression plate have been designed. The dial micrometer is graduated in 0.001 in., and has a spindle travel of 1 in. The lower loading fixture has a dovetail slide and mounted on this slide is a boss with a tit, the combined length of which is equal to the compressed length of the spring. The boss is made detachable from the slide as a different boss is required for each varying closed spring length. The slide itself may be pulled out of the fixture by means of the handle and is centered by a ball-spring stop. A dial micrometer with 1 in. spindle range was chosen purposely in case it was important to control the open length of the spring.



Dial Micrometer and Spring-Loading Fixture shown in working position on a D-type Elasticometer

"New Rockford" Type A T, Toggle-Joint Foot Press

A toggle-joint foot press has recently been added to the line of "New Rockford" equipment made by the Rockford Iron Works, Rockford, Ill. The press is used for riveting and clinching operations. In the machine shown a special horn has been applied for riveting ears on coffee pots and percolators. Because of the slow movement of the toggle-operated slide near the bottom of the stroke, better riveting conditions prevail and the metal is allowed to flow at a slower speed than would be the case with a direct lever-operated slide. The treadle is returned to the operating position by a counterweight.



"New Rockford" Toggle Joint Foot Press

"Catchdew" Dehumidifier

Designed to maintain a uniform relative humidity in lithographic and letterpress printing rooms for 24 hours a day, a "Catchdew" dehumidifier is now being manufactured by the National Humidity Reduction Company, Louisville, Ky. Although not originally planned by its inventor to be so used, the unit displays possibilities for removing moisture in pattern storage vaults and the protection of small tools and parts which are likely to become rusted through exposure to moisture.

No fans are used with the dehumidifier and ventilation is from the

usual windows. One unit will, under ordinary circumstances, dehumidify 6,000 cu.ft. of air, keeping it constantly at a low degree of humidity regardless of outside conditions. The unit is 41 in. high and 14½ in. in diameter with a glass jar underneath into which extracted water trickles. It is suspended from the ceiling.

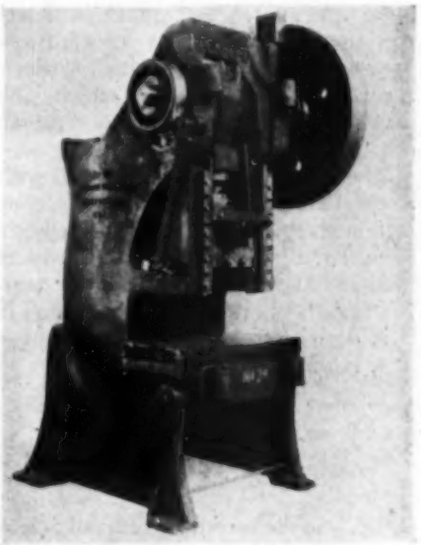
The object of the outside shield is to afford a means of decreasing the amount of air which enters the unit on dry days. Inside of the shield is a wire container and inside of this a smaller perforated container. A chemical compound, which collects the moisture from the air, is located inside this latter container. The collected moisture, precipitated by the chemical, trickles down into the jar. The chemical is heated by a small electric unit, the current being taken from any ordinary outlet, and a small pilot light on top of the unit shows whether the current is on or off. The heat "regenerates" the chemical and keeps it effective for a period of approximately a year. The units are serviced by the manufacturer, and the chemical is renewed when necessary. In use an ordinary hygrometer is used to determine the degree of humidity in the room. Where a constant degree of humidity is desired, the unit is left in operation day and night.

An experimental installation of this unit made in May, 1929, in a lithographic press room maintained humidity within a range of 35 to 40 per cent at a temperature of 70 deg. F. The highest humidity in extremely wet periods was 55 per cent.

"New Rockford" Type R Inclinable Presses

A complete line of Type R inclinable presses has recently been developed by the Rockford Iron Works, Rockford, Ill., in sizes from Nos. 1 to 8. They may be had in either the single-geared or the flywheel type. The latter may be arranged for direct motor drive to a gear on the periphery of the flywheel, the motor being mounted on a bracket bolted to the finished pads on top of the frame. In this design, the motor is set at an angle equal to half the amount of inclination of the press so that in the maximum inclined position the motor base will be at only a slight angle to the horizontal. For such a drive the starting switch is mounted on the frame of the press, making it a self-contained unit. A gear guard is provided completely enclosing the motor pinion and flywheel.

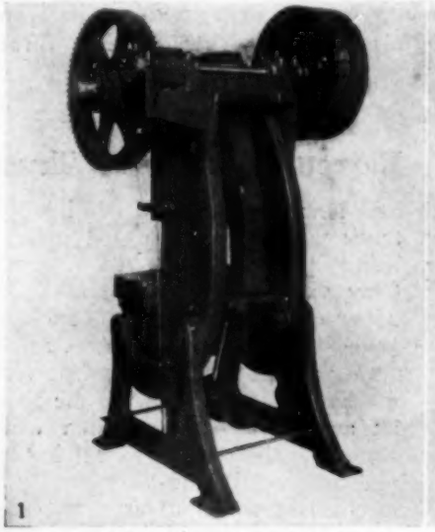
This line of inclinable presses is equipped with heat-treated crankshafts and connection screws. In each size the crankpin has twice the area of the crankshaft. Other features are: sensitive cushioned band brake; ball-type connection with adjustment for wear and removable ball seat in the slide; and extra long gibs.



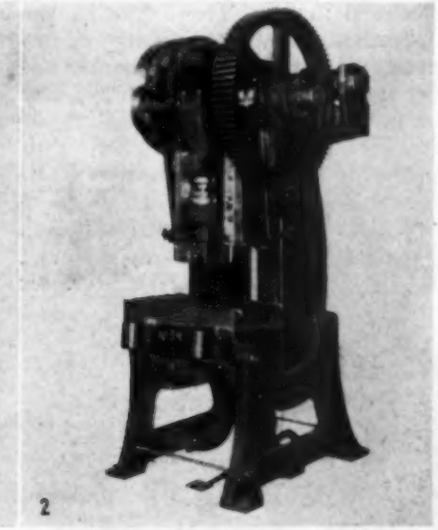
In the larger sizes, such as the No. 7R "New Rockford" press illustrated, a solid housing type of construction is employed

All sizes up to the No. 6 size are equipped with a sliding rectangular bolt clutch. Beyond this range the machines are equipped with an automatic 3-jaw clutch having three automatic locking pins that prevent rebound of the slide on drawing and heavy forming operations. These three locking pins also prevent the slide from running ahead of the clutch on the down stroke in the event of a heavy punch being used.

In the single-geared models, a unit backshaft bracket is a feature. This backshaft is Timken equipped, with two Timken bearings on the flywheel end and one bearing on each side of the pinion, the purpose of the outer bearing being to prevent any deflection of the pinion end of the backshaft when under load. In addition to being bolted into place, the end bracket is tongued into the main



Rear view of the No. 4R machine showing the inclining screw mechanism and the unit backshaft construction



"New Rockford" No. 5R inclinable press with a single geared back drive. Main bearing caps are set at 45 degrees

bracket casting, thus increasing the rigidity of the structure.

Up to and including the No. 5 machine, the main bearing caps on this line of presses are set at an angle of 45 deg. in order to eliminate the objectionable feature of exerting pressure on the joint between the cap and the frame of the press. On the larger size machines the main bearings are carried in a yoke integral with the frame and the split of the bearing cap is in a horizontal plane so that practically no pressure can come upon the split. The main bearings and the crank bearings on all these presses are bronze bushed with a special bearing bronze which the manufacturer claims will not squeeze out under heavy load.

These presses are all equipped with a crossbar knockout in the slide as standard equipment. The flywheels have solid webs, and the flywheel models have machined pads for supporting the backshaft for gearing if it is desired to make this changeover at a later date.

On some of the larger sizes the slide can be designed to enter the gibs on the up stroke. On standard presses the slide extends slightly below the gibs on the up stroke so that dies of large size can be accommodated. In general, it is said that these presses have higher die space than the average.

Except for the heavier sizes, adjustment of the inclination of the press is by means of a screw at the rear actuated by means of a ratchet wrench, which is provided with each machine. The heads of the rear bolts for clamping the frame are recessed into the legs, thus forming positive locks in four different positions. Because of their weight, the heavier sizes are not provided with an inclining attachment. These presses are generally set in a vertical or an inclined position by means of block and tackle. In this instance, only three positions are provided for the recessed bolt heads. These pockets prevent any movement of the frame after it is once set.

Burgess Bearing Tester

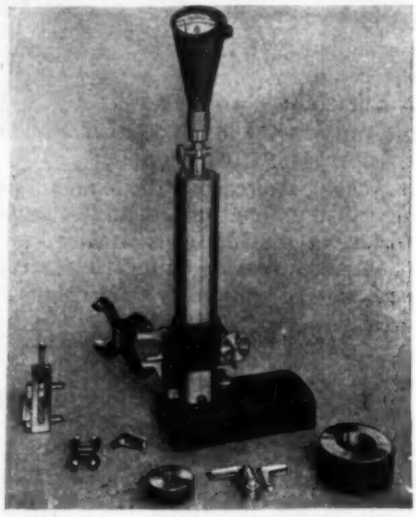
To provide an improved and scientific method for the inspection of ball and roller bearings, the Burgess Bearing Tester has been developed by the C. F. Burgess Laboratories, Inc., and is now being marketed by the Burgess-Parr Company, Room 1806, 111 W. Monroe St., Chicago. By means of this instrument, bearings can be sorted more definitely and accurately than by the old method of listening to them. Actual inspection time is not increased, and great savings in time can be effected because of the definite readings procured, according to the manufacturer. No time need be lost in ascertaining the proper classification of "border-line" bearings.

The accuracy of this electrical method of inspection is going to be of even greater importance. Experiments have proved that the Burgess bearing tester repeats readings from day to day consistently, or from operator to operator. The instrument is sufficiently accurate to sort bearnings into as many as five grades between excellent and defective.

The Burgess bearing tester is one of a group of acoustimeters, designed particularly to detect the amount of undesirable vibration in ball and roller bearings. These vibrations are transformed into electrical impulses, amplified so as to deflect the needle of an electrical meter. The extent of the deflection indicates the amount of undesirable vibration in the bearing under test. By means of electrical filters only those vibrations indicative of bearing quality are amplified, thus providing an accurate method of measurement and absolute independence of outside extraneous noises. This tester is simple to operate and requires no specialized operator. It can be used in a noisy room as well as in one made sound-proof. The machine is provided with adaptors to test all bearings from 2 in. diameter to 6 in. Special adaptors can be made to order.

Mikrotast Snap Gage Verifier

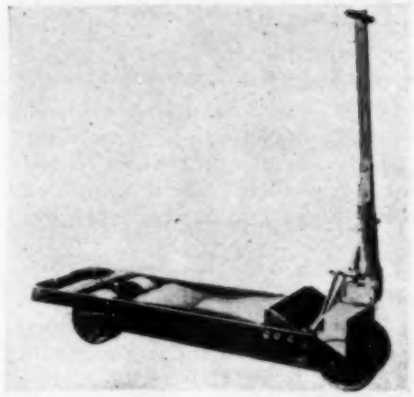
A Mikrotast snap gage verifier is being marketed in the United States by the Coats Machine Tool Company, Inc., 110-112 W. 40th St., New York



N. Y. The gage has capacities from 0.275 in. to 7.875 in. Accuracy is guaranteed to within plus or minus 0.00002 in. The use of this gage may be seen readily from the illustration. It may be used for testing or checking snap gages as shown, and also for plain ring and ring thread gages.

Barrett Multiple Lift Truck

A new hand-operated multiple lift-truck with several unusual parts is being produced by the Barrett-Cravens Company, 1328-1342 W. Monroe St., Chicago. Included among the exclusive features are: a spring handle holdup which prevents the handle from falling to the floor; an automatic releasing latch which eliminates the handle from flying up; and a special long-leverage lifting mechanism which assures an easier lift. Timken roller bearings are used throughout. The truck is geared to the lead in such a manner so as to permit a variation in the lifting



stroke. The mechanism is totally enclosed on top and is not exposed to the dust and dirt seeping through from loads carried. Hydraulic check of improved design is placed under the center of the load and equipped with a stuffing box.

The Barrett truck is capable of lifting loads with the handle located anywhere in an arc of 200 deg. According to the manufacturer, actual tests have proven this angle lift to be more than sufficient to cope with most of their conditions. The truck is capable of lifting a load in a minimum of two and maximum of eight strokes of the handle. For a complete lift of 2½ in., a minimum of four strokes is necessary. The wide range of strokes is unrestricted dependent upon the ability of the trucker and the weight of the load handled. If the load is heavy the trucker may lift it with eight easy strokes. If the load is light he lifts it with 2, 3, or 4 quick strokes. The truck has a capacity of 6,000 lbs., and is available with lifts of either 2½ or 3 in. The Model T is 18 in. wide and is available in sizes to handle clamp-ons varying in size from 24x42 to 36x84 in., and the length of carrying frame from 36 to 72 in. The Model TK is 24 in. wide and is made in sizes to handle platforms from 29x42 to 44x84 in. in size and has a carrying frame varying from 48 to 72 in. in length. This latter model is also available in models 27 in. wide at additional cost.

"Stable-Arc" 400-Amp. Gas-Engine-Driven Welder

A new gas-engine-driven welder with a rating of 400 amperes has recently been placed on the market by the Lincoln Electric Company, Cleveland, Ohio, manufacturers of "Stable-Arc" Welders and "Linc-Weld" Motors.

The growing use of larger-sized electrodes led to the development of this larger machine designed for field work in all kinds of construction work. Current range runs up to 500 amp., and is of the variable voltage, single-operator type, operating at 1,500 r.p.m. The working mechanism of all controls is contained in a ventilated, enclosed steel cabinet with hand regulators and switches mounted on a side panel. The control panel contains rheostat, diverter switch, volt-ammeter, and wing nut terminals for cables. This unified control is claimed to increase the simplicity of operation.

The control cabinet is mounted directly over the generator for easy access by the welding operator. The commutator of both the welding generator and the exciter are provided with covers for protection and also to prevent the possibility of injury to the commutator.

The welder is driven by a six-cylinder engine with an S.A.E. rating of 33.75 and a brake horsepower at 1,500 r.p.m. of 55. The cylinder size is 3¾x5, with a total displacement of 330 cu.in. An automatic throttle control which permits the engine to idle at about half speed when the arc is not going is provided. When the arc is struck the engine immediately comes up to full speed. Provision is made by a time delay to keep the engine going at full speed when the arc is momentarily broken. This permits the operator to change electrodes without affecting the speed. However, if it is necessary for the operator to change position, the slow down occurs.

Wheels are optional. When furnished they have 6-in. tread. A fifth wheel is provided for short turning. Over-all dimensions, exclusive of wheels, are 104x32x58 in. and the weight is approximately 3,500 lb.

Crescent Electric Industrial Power Lift Truck

A new type of electric industrial power lift truck has been developed by the Crescent Truck Company, Lebanon, Pa., for use with hand truck platform skids of 7 in. high or more. Operation costs of this truck,

designed to fit into a field between heavier industrial trucks and the ordinary hand lift truck, is claimed to be less than $0.18 per hour, including all costs except the operator's wages.

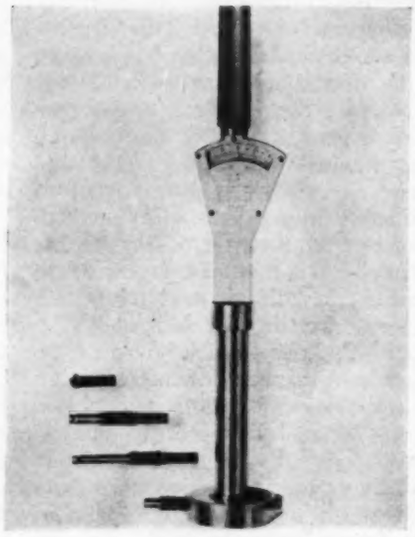
The capacity of the truck is 3,500 lb.; the over-all length, 88 in., and the over-all width, 33 in. It has a turning radius of 7 ft., and a lifting platform, 20 in. wide and 40 in. long. The drive is by spur gear with a reduction of 19 to 1. Both driving and elevating motors are built by General Electric. Two speeds forward and two speeds in reverse are provided. The foot brake pedal interlocks with the control mechanism.

All moving parts are bronze bushed and are provided with Alemite fittings. Fafnir ball bearings and Timken roller bearings are used throughout. Standard Exide or

Edison assembly batteries are used. Included in the features of the truck are cantilever spring suspension on the driving unit; rubber tires on all four wheels; 3 in. underneath clearance; and 3¼ in. lift.

Swedish Inside Indicator Gage

An inside indicator gage for accurately checking the diameter, taper, and out-of-roundness of deep holes has been announced by the Swedish Gage Company of America, Detroit, Mich. This addition to the Swedish line of precision instruments is made in two sizes, No. 3L and No. 5L. The No. 5L (illustrated) was developed primarily for checking cylinder bores in original manufacture and in regrinding operations.

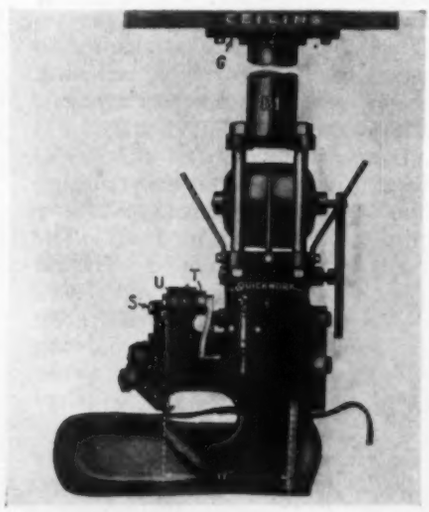


Because of the unique construction of the centralizing mechanism, the indicating anvils are always located diametrically, insuring accurate, positive reading. The indicator scale is graduated in thousandths and ten-thousandths. Graduations of sufficient width to detect variations in diameters of five one-hundred-thousandths (0.00005 in.) are provided. The gaging anvils are hardened, ground, and lapped. Anvils tipped with diamonds or tungsten carbide can be furnished when requested.

"Quickwork" No. 7 Rotary Shear

A rotary shear for trimming stampings is being manufactured by the Quickwork Company, St. Marys, Ohio. It is made in four designs, A, B, C, and D, all having a capacity of 14 U. S. gage and lighter, and having two speeds.

In all designs the shear body proper is the same, but the mounting and control is furnished in different arrangements. There is also a choice of control of starting, stopping, and speed changes between a hand lever as in *A*, Fig. 1, or a foot control, operated by a triple foot pedal. Pressure on one end of this rocking pedal starts the shear and gives one speed, pressure on the opposite end gives the second speed, and pressure on a center pedal stops the machine. Belt and motor drive arrangements on all designs are identical. *B* and *B1* in Figs. 1 and 2 are lengths of pipe utilized for supporting the shear. *G* in Fig. 2 is the flanged plate which supports the shear when it is ceiling mounted.

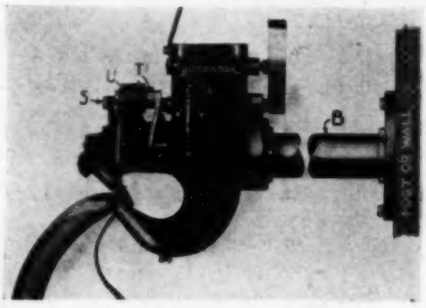


Shear suspended from a horizontal ceiling or surface and arranged for a motor drive

The cutter head is instantly raised and lowered by means of lever *R*. Swinging of lever *A* to one side starts the shear and gives one speed, swinging it to the opposite side gives the other speed and swinging it straight out stops the machine. The distance from cutting edges of cutters to the back of the shear jaw is 17 in. as indicated in Fig. 2. This distance, together with the absence of a floor support permits the swinging of stampings under and around the shear and affording ample clearance for swinging and cutting large odd-shaped stampings of almost any kind. The throat dimensions permit cutting to the finish line of practically any stamping without the necessity of making a preliminary roughing-off cut.

A 1-hp. motor is required to operate the shear. Net dimensions, less the motor mount and extension pipes, are 30x20x32 in. high. Approximate net weight is 1,000 lb. The pulley indicated in Fig. 1 is 14 in. in diameter x 3 in. wide and runs at 250 r.p.m. Standard cutter diameter is 2 in., and cutting speeds are from 8 to 22 ft. per min. Vertical depth of the throat is 7 in., and the horizontal depth 10 in.

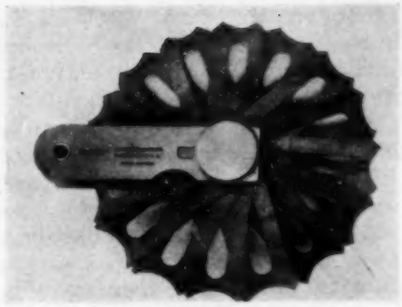
Any motor can be used, but one with a speed of from 1,100 to 1,200 r.p.m. is preferred. A customer's motor is mounted without extra charge as indicated in Fig. 2, if desired. The machine can be arranged to run at any speed not exceeding 50 per cent faster or slower than the speeds given if specified in the purchase order.



Standard shear supported from a vertical wall, post, or support and arranged for belt drive

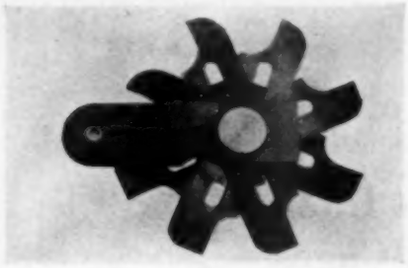
Brown & Sharpe No. 627 Fillet and Radius Gages

Five sizes of fillet and radius gages are being produced by the Brown & Sharpe Manufacturing Company, Providence, R. I., of which two are illustrated. The checking or measuring of fillets and radii is claimed to be a moment's work by the use of these instruments. Long sliding blades make the tools easy to use and to handle. Each gage has but half the usual number of blades for a given range, thus enabling the desired



size to be found quickly. Practically all blades can be extended at one time. The blades are of hard rolled steel and can be clamped securely. They are approximately twice as long as the usual blades and are double-ended. Concave and convex radii of the same size are on the same blade. Light metal is used where possible.

The gages are made in two styles. The Nos. 627A and 627B have a blade form for checking fillets and radii in corners or against shoulders. No. 627C and 627D are useful in laying out forming tools as well as for gaging fillets and radii. No. 627A and 627B have eight blades, 627A having a radii capacity of from



$\frac{1}{32}$ to $\frac{17}{64}$ in. by 64ths and No 627B having from $\frac{9}{32}$ to $\frac{33}{64}$ in. by 64ths. The No. 627C has 15 blades taking radii from $\frac{1}{32}$ to $\frac{1}{4}$ in. by 64ths, and No. 627D has 16 blades taking radii from $\frac{17}{64}$ to $\frac{1}{2}$ in. by 64ths.

Wickes, 60-In., Heavy-Duty, Triple-Geared, Face-Plate Drive, Engine Lathe

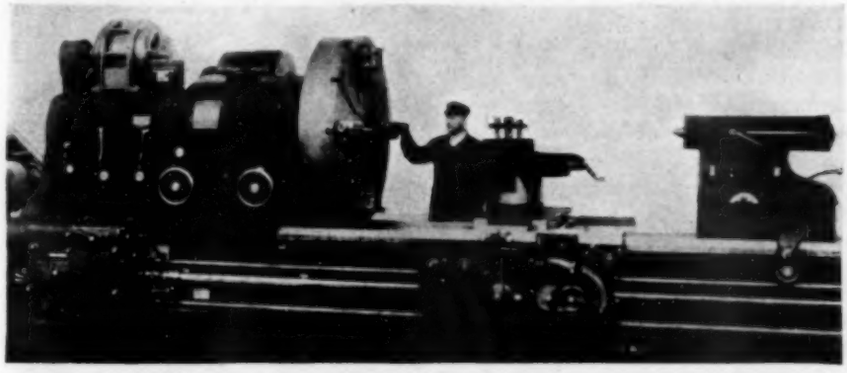
A 60-in., heavy-duty, geared head engine lathe has been announced by Wickes Brothers, Saginaw, Mich. This lathe has been completely redesigned and modernized and is now made with unusually large members, equipped throughout with ball or roller bearings. The only exceptions are the main spindle bearings which are bronze boxes. All gears are of alloy steel heat-treated and hardened, and sliding gears are mounted on splined shafts.

The new design of geared headstock provides 16 spindle speeds and a range of face-plate drive speeds from 2 to 50 r.p.m. This range is claimed by the maker to be far above any range previously provided in any make of lathe. Direct spindle drive speeds from 8 to 200 r.p.m. are also obtainable.

The face-plate pinion is mounted on a heavy shaft with roller bearings on both sides. This construction eliminates the overhanging pinion ordinarily found in lathes of this type. The main spindle is a high-carbon steel forging having its journals ground and burnished to exact size. A ball thrust bearing takes the spindle thrust. The headstock is filled with oil to a level and has a sight glass gage on the front. A geared pump supplies a head of clean lubricant through piping to each bearing. The gears run in an oil bath which provides a splash system in addition to the pressure system. The compound rest is of extremely heavy construction, the swivel being bolted to the lower slide by four bolts. The swivel is graduated for any angle up to 90 deg., and adjustable taper gibs provide ample take-up for all wear.

Electric rapid longitudinal traverse for the carriage as well as power rapid cross traverse may be provided if desired. The apron is of the double plate design, providing a support on both ends of all the gear studs and obviating any likelihood of bending these parts or disturbing the proper centers for the gears. The lathe bed is of heavy section, cast in one piece and rigidly braced internally by double-walled cross girths. The V's and wearing surfaces on the upper portion of the bed are hand scraped.

Specifications are as follows: Swing over bed, 62 in.; swing over slide on carriage and compound rest, 50 in.; length of bed (standard), 20 ft.; takes between centers 8 ft.; takes between centers (tailstock overhung) 9 ft. 1 in.; Morse taper centers, No. 7; hole in spindle, $2\frac{3}{4}$ in.; lead screw, double thread, single pitch, diameter, 3 in.; r.p.m. of driving pulley, 300; highest gear ratio, 150 to 1; number of feed changes, 40; range of longitudinal feeds per revolution of spindle, 0.025 in. to 0.700 in.; range of cross feeds per revolution of spindle, 0.009 in. to 0.252 in.; steady rest, opening, 20 in.; carriage length, 4 ft. $10\frac{7}{8}$ in.; face plate diameter, 60 in.; tool post takes tool shank (maximum size) $2\frac{1}{2}$ in.; net weight (standard length of bed), 48,000 lb.; hp. required, 40; floor space, 7 ft. 1 in. x 22 ft. 0 in.; over-all height (without motor) 7 ft. 3 in.

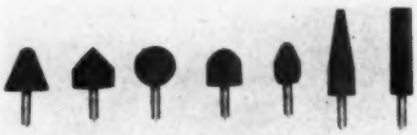


Carborundum and Aloxite Grinding Wheels and Points

To meet the demand for wheels for several types of portable grinders now being manufactured, the Carborundum Company, Niagara Falls, N. Y., has standardized on a wide variety of shapes and sizes of grinding wheels and mounted abrasive points for use on these grinders.

Wheels and mounted points offered by the Carborundum Company are made both in Carborundum Brand silicon carbide and Aloxite Brand aluminum oxide and have been developed through co-operation with

manufacturers of portable machines. These wheels are produced in practically every size and shape, and in a range of grits and grades as to make them suitable for every grinding condition. Wheels are supplied in grits and grades suitable for various metals, such as cast iron, bronze, alloys, steel, and aluminum. Typical shapes are shown in the accompanying illustrations.



Krupp Mikrotsat Internal and External Gages

Krupp adjustable internal gages with centering support and interchangeable extension legs are being introduced by the Coats Machine Tool Company, Inc., 110-112 W. 40th St., New York City. Instead of the usual star gage having the gaging point opposite two fixed points of abutment, these gages have the gaging contact end between two fixed points of abutment. What would otherwise constitute the gaging end is directly opposite the gaging point under spring pressure. Very accurate readings are possible with this type of gage, it being even possible to "split the ten-thousandths."

The spring-operated yoke with two corner supports insures centralized position along the bore. The measuring contact point is located between these corner supporting points while the interchangeable extension leg is inserted opposite the measuring contact point. This extension leg may be adjusted to any desired diameter within the measuring range of the gage and locked in this position. The gage will assume correct location in the diametral plane of the bore because the spring pressure exerted on the corner supporting points is considerably greater than that of the measuring contact point. The full diameter, not a shorter chord, is thus measured.

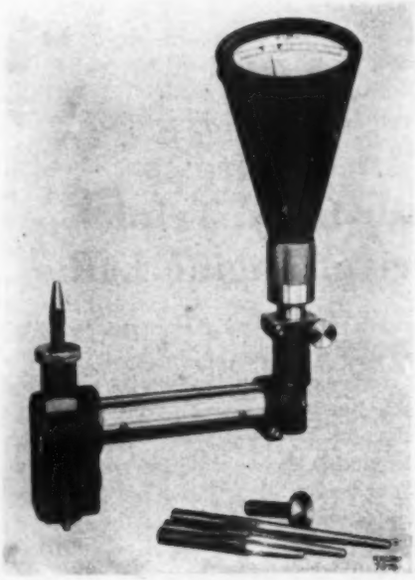


Fig. 3—Adjustable internal gage with angular adapter, centering support and extension legs for bores from 2.165 in. upward

Fig. 1—Adjustable internal gage with centering support and interchangeable extension legs

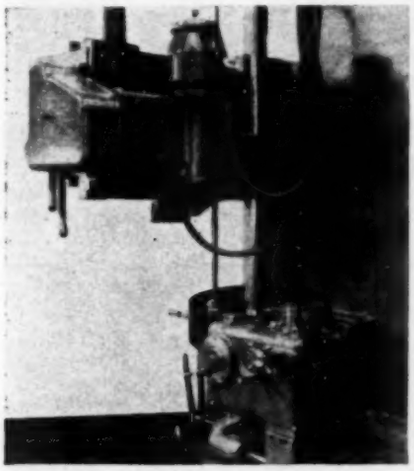
Several advantages are claimed for these internal gages. The builders claim it is possible to control every part of the bore at practically any diameter and depth, including blind holes down to the bottom. Any deviation from standard diameter is indicated by the Mikrotast hand. The measuring contact point of the larger gages with the centering support is tipped with a Krupp special wear-proof alloy. If desired, the extension leg and the measuring contact points and measuring plates of the smaller sizes may be furnished also faced with this alloy. A mirror, inclined at an angle of 45 deg., and made of Krupp non-rusting steel, may be attached to the dial window. This will make the graduations visible from above and is found convenient in gaging cylinder blocks when they are in a vertical position.

Three types of this gage are illustrated: In Fig. 1, the adjustable gage with its centering support and extension legs, in Fig. 2 the gage with a micrometer adjusting attachment between the adapter and gaging head which facilitates the setting, and Fig. 3, the gage with an angular adapter, centering support, and extension legs for bores from 2.165 in. upward in diameter. The adjustable gages may be obtained with capacities from 0.787 to 14.173 in., in six sizes with extension fingers numbering from 3 to 8, depending upon the capacity. These gages without the extension rod will gage a maximum depth of from 2 to $5\frac{1}{2}$ in., depending upon the size of the gage. Extension rods for deep holes are available in lengths of from 2 to $11\frac{3}{16}$ in.

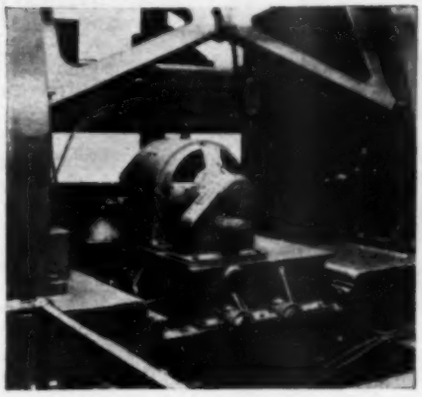
Fig. 2—Adjustable internal gage with micrometer adjusting attachment between adapter and gaging head

Cincinnati 10 Ft. Vertical Boring Mill

The Cincinnati Planer Company, Cincinnati, Ohio, has redesigned the 10-ft. boring mill produced by the company and has added several features which have not been previously embodied on this type of machine. The table is now driven by an internal spur gear driven in turn by hardened spiral bevel gears. The mounting of these spiral bevel gears is of the ball bearing type and insures a smooth rolling action to the gears as well as to the table.



Right-hand end of rail, showing rapid-traverse motor

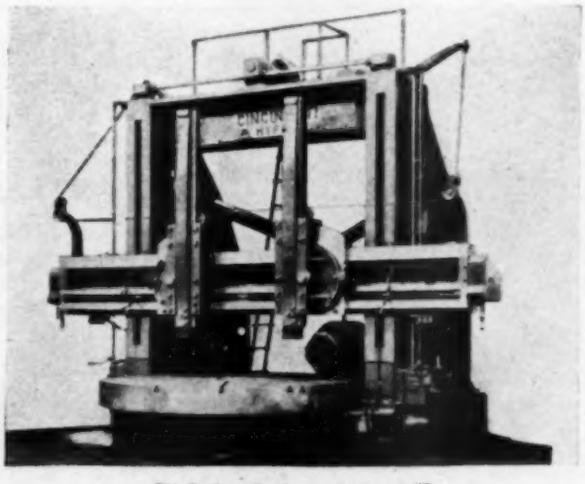


A rear view of the mill, showing motor mounting

Table track and spindle are lubricated by a pump which circulates oil to all of the units as well as to the speed box. The speed box is rigidly mounted between two extensions driven by a variable speed motor. The drive from the motor to the speed box is through herringbone gears. A constant-speed motor can also be used in which case a 9-speed box is supplied in place of a 4-speed box ordinarily supplied. A tank placed underneath the spindle gages the oil from the speed box and the table track before it is pumped to the units. A reservoir inserted in the machine insures clean oil and a gage mounted in a conspicuous place shows the operator when the system is operating satisfactorily.

Movement of the head is controlled by push buttons. Small motors mounted on each end of the rail, interlocked with the feed, supply the rapid traverse or the feed to the head by a simple lever-shifting operation. This eliminates all mechanism on top of the machine. Heads are independent of each other and controlled by separate feed box and independent rapid-traverse motors. The rail is raised and lowered by another motor placed on top of the machine and controlled by push button. These motors are interlocked so that it is impossible to raise and lower the rail when it is clamped.

With this new method of control it is possible for the operator to change the speeds of the table and the rapid traverse to the heads, clamp the rail, and raise and lower the rail without leaving his position. This serves to cut down the set-up time. The complete line of Cincinnati boring mills has been redesigned similar to the machine shown. Side heads can be supplied if the customer wishes them.



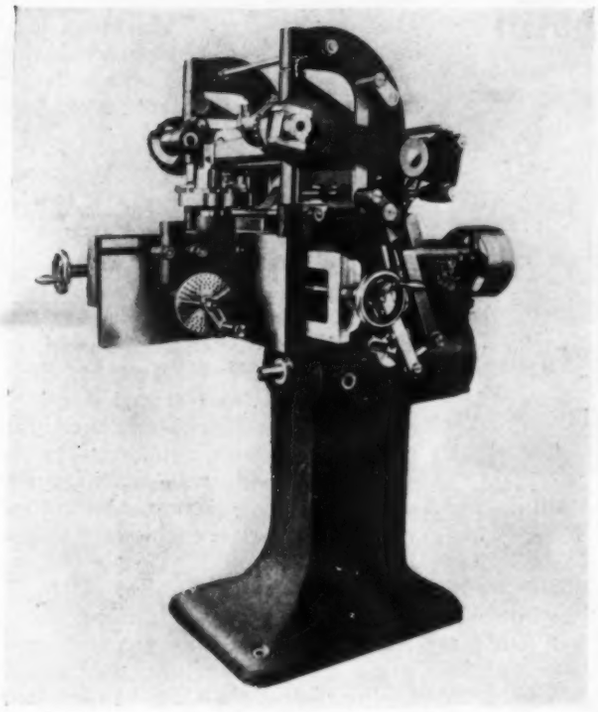
Right-hand view of the mill

Bernitz Vertical Punch and Die Shaper

A patented vertical punch and die shaper is now being marketed by J. I. Bernitz, 47-49 West St., New York City. This patented shaper is an unusual machine which is claimed to have very wide application in the die-making field. The manufacturer claims that the simplicity of the tools used and convenient scales and indexing devices make it possible to have punches and dies finished 70 to 90 per cent by unskilled, cheap labor. Hand filing and finishing is claimed to be reduced to a minimum and is said in most cases not to be necessary.

Applications of the machine are in the manufacture of punches, especially of odd shapes for cutting and stamping dies, for all kinds of slotting operations on dies, and for grinding and finishing the hardened punches with a special grinding motor. Advantages claimed include simplified fastening of the punch to the punch-pad by means of screws since the foot of the punch is shaped simultaneously with the shaping of the punch profile by the swinging-out motion of the tool-holder. The minimum radius at the foot of the punch is approximately $\frac{3}{8}$ in. Another advantage claimed is that few tools are required which can be ground in the usual way, and do not require complicated grinding. Because of the swinging-out motion of the tool at the end of the stroke, chips are discharged towards the back of the machine, thus lessening the hazard to the operator. The machine is so arranged that markings are easily visible, thus making accurate work possible. A convenient indexing head makes the machining of radii and sub-divisions of practically any kind easy. Hardened punches can be ground by attaching a motor-driven grinding spindle to the tool-holder.

Horizontal travel of the table is $9\frac{7}{8}$ in., and the length of the stroke varies from $\frac{1}{16}$ to $3\frac{1}{16}$ in. The maximum length and width of dies which can be slotted is $9\frac{7}{8}$ in., and the maxi-



Bernitz Vertical Punch and Die Shaper, which leaves little hand work

mum thickness is $3\frac{1}{16}$ in. An 8-in. driving pulley is used which is $2\frac{3}{8}$ in. wide and travels at a speed of 340 r.p.m. Floor space required, 40x 51 in. Net weight, 1,350 lb.

TRADE PUBLICATIONS

AFTERCOOLERS. The Pennsylvania Pump & Compressor Co., Easton, Pa., has issued Bulletin No. 150 describing Pennsylvania Aftercoolers. Various types of aftercoolers are illustrated and their characteristics discussed.

AUTOMATIC CONTROL. The Johnston Manufacturing Co., 2825 E. Hennepin Ave., Minneapolis, Minn., has issued Circular No. 1000, illustrating the valveless automatic controllers for industrial oil burners built by this company. Technical descriptions of the various types illustrated by photographs are included.

DIE CASTINGS. The Milwaukee Die Casting Co., 291-299 Fourth St., Milwaukee, Wis., has issued a booklet entitled "What the Manufacturer Should Know About Die Castings" which contains a series of discussions on various subjects in connection with die castings. The booklet is fully illustrated.

DIE CASTINGS. The Die Casting Equipment & Engineering Co., Inc., 60 E. 42nd St., New York City, has issued a new booklet entitled "A Message of Importance to Manufacturers and Users of Die Castings" which gives a description of the manufacture of die castings and similar information.

DRILLS. The Guibert Steel Co., P. O. Box 1037, Pittsburgh, Pa., has issued a catalog entitled "The Guibert 'Toggle Bug,' A Portable Drill," which describes the drill manufactured by this company.

ENGINE LATHES, HEAVY-DUTY. Wickes Brothers, Saginaw, Mich., has issued bulletin EB-60 entitled "Wickes 60-in., Heavy-Duty Engine Lathes" which describes the new geared-head engine lathe announced by the company, giving complete specifications and technical information.

ELECTRICALLY HEATED PLATENS. The Harold E. Trent Co., 439-443 N. 12th St., Philadelphia, Pa., has issued leaflet TB-24 on "Trent Electrically Heated Platens," a reprint of an article written recently by Mr. Trent.

HAND LIFT TRUCKS. The Barrett-Cravens Co., 1328-1342 West Monroe St., Chicago, Ill., has published bulletin No. 123 on "The New Multiple & Red Head Lift Trucks" which describes in detail the mechanism and available sizes of the new Barrett truck, Models T and TK.

INTERCHANGEABLE PUNCHES AND RETAINERS. The Whitman & Barnes, Inc., Detroit, Mich., has issued catalog No. 94, entitled "Hercules Interchangeable Punches and Retainers," which covers the latest development of this company. The catalog includes explanatory matter regarding the principle of the new system of punches and retainers and their application.

SPEED REDUCERS. Winfield H. Smith, Inc., Springville, Erie County, N. Y., has issued Catalog No. 25 describing a complete line of speed reducers of small and fractional hp. capacity. Many new reducers, including a line of ball and roller bearing equipped units, are shown in the catalog. A line of light power transmission machinery, including grooved pulleys and small hangers, pillow blocks, and couplings is included.

ROTARY SHEARS. The Quickwork Company, St. Marys, Ohio, has issued Catalog No. 90 illustrating and describing "Quickwork" rotary shearing, beveling, flanging, and joggling machinery. Illustrations of typical operations are included.

PATENTS

August 19, 1930

Metal Working Machinery

Machine For Making Annular Laminated Bodies. George T. Trundle, Jr., Cleveland Heights, Ohio, assigned to William T. Hensley. *Patent 1,773,382.*

Apparatus For Gear Grinding. Frank Burgess, Wollaston, Mass. *Patent 1,773,386.*

Apparatus For Bending Angle Irons. Thomas A. McDonnell, Lakewood, Ohio. *Patent 1,773,430.*

Press For Drawing Sheet Metal And the Like. Fredrich J. Rode, Chicago, Ill. *Patent 1,773,438.*

Cushioning Device for Drawing Presses. Fredrich J. Rode, Chicago, Ill. *Patent 1,773,439.*

Machine For Punching and Forming Inwardly-Depressed Orifices in Tubes and Pipes. Eugene Frank Deléry, New Orleans, La. *Patent 1,773,522.*

Metal-Working Press. Fredrich J. Rode, Chicago, Ill. *Patent 1,773,548.*

Molding Machine. Albert William Sizer, Hessel, England. *Patent 1,773,552.*

Forming And Cutting Machine. Orren H. Slafter, Los Angeles, Calif., assigned to Boyle Manufacturing Company, Inc. *Patent 1,773,647.*

Machine For the Production Of the Faces Of Teeth Of Gear Wheels. Richard Herrmann, Frankfort-on-the-Main, Germany. *Patent 1,773,677.*

Tools and Attachments

Lap. Richard Groetchen, Chicago, Ill. *Patents 1,773,176—1,773,177.*

Adjustable Portable Folding Sandblast Cabinet. Richard Ruemelin, St. Paul, Minn. *Patent 1,773,374.*

Tool Holder For Grindstones. Charles E. Davidson, Clinton, Ill. *Patent 1,773,448.*

Attachment For Welding Machines. Earl W. Little, Indianapolis, Ind. *Patent 1,773,465.*

Grinding Implement. Thaddeus A. Jackson, Brooklyn, and William J. Skelly, New York, N. Y. *Patent 1,773,679.*

Furnaces

Furnace Wall. Lee M. Beall, Tulsa, Okla. *Patent 1,773,339.*

Method of Making Furnace Roofs. Glenn E. Hillard, Brackenridge, Pa. *Patent 1,773,359.*

NEWS OF THE WEEK

Remainder of Metal Congress Program Announced by Sponsor Societies

THE National Metal Congress, which will convene in Chicago Sept. 22, will have 35 technical sessions on its program. The American Society for Steel Treating, the American Welding Society, and the American Society of Mechanical Engineers are each devoting eight sessions to the presentation of technical papers, while the American Institute of Mining and Metallurgical Engineers will have seven such sessions.

Meetings of the American Welding Society will be held in the Congress Hotel, but the Exposition and technical sessions of the other societies will be held in the Hotel Stevens as previously announced. More than 175 firms have taken space at the Exposition, according to W. H. Eisenman, secretary of the A. S. S. T., which sponsors both the Congress and Exposition.

In addition to its technical programs, the A. S. S. T. has arranged a session on sales problems and methods. Prof. R. C. Borden and Alvin C. Busse will present a dramatized lecture on sales strategy, and other talks of similar nature are scheduled.

Among the other papers of the A. S. S. T. are "Corrosion and Heat-Resistant Nickel-Copper-Chromium Cast Iron," "Physical Properties of Fine Bolts," "Cemented Tungsten Carbide," "Cold-Heading Die Life," "Effects of Prequenched Treatments on the Hardness, Body and Structure of Hardened Tool Steel," "Forging Practice at the U. S. Naval Gun Factory," "Heat-Treatment Furnaces Used in Manufacture of Telephone Equipment," "Copper Brazing in Hydrogen Electric Furnaces," "Relationship Between Welded-On Overlays and Heat-Treatment," "Casting Guns by the Centrifugal Process," "Nitriding in Packing Materials and Ammonia," "Further Investigations in Nitriding," "Nitriding the Larger Forgings," "Nitriding Furnaces and Their Equipment," "Microcharacter Hardness Tester," "Relation of Structure to Surface Hardness of a Case-Hardened Steel" and "The Resistance of Steels to Abrasion by Sand."

The program of the American Welding Society lists 18 papers, among them: "The Examination of Welds by the X-Ray Diffraction Method," "Fatigue Investigations of Welded Joints," "Stress Distribution in Welded Joints," "Testing of Welds," "Welded Steel Bar Joists," "Cost of Using Welding," "Strength of Welded Joints in Tubular Members for Aircraft," "Tensile Tests for Welds," "Bend Tests for Welds," "Shear Tests for Welds," "Impact and Fatigue Tests for Welds," "Double Lengthening Railroad Rails," "Building Up Battered Ends of Rails," "Welded Steel Tubing," "Magnetic Testing of Butt Welds," "Welding of Stainless Steel," "Arc-Welding of Aluminum" and "Oxy-Acetylene Welding of Corrosion Resisting Steels."

Among the papers of the A.I.M.E. is one on "Influence of Casting Practice on the Physical Properties of Die Castings" and another on the "Effect of Certain Alloying Elements on Structure and Hardness of Aluminum Bronze." Others include the "Modulus of Elasticity of Aluminum Alloys," "Quenching of Alclad Sheet in Oil" and "Experiments on Retarding the Age Hardening of Duralumin."

Echoes of Japan

Among the many courtesies extended to some of the more privileged engineers who visited Tokyo last year to attend the World's Engineering Congress, were native dinners in typical Japanese tea houses and homes. The one illustrated was tendered by Mr. V. Chadani, of the Ataka Company, to Mr. and Mrs. Luther D. Burlingame and Mr. and Mrs. Fred H. Colvin. Mr. Chadani is at the left, the others are representatives of Ataka and Co., with the exception of Mr. S. Hata, directly behind the geisha girls, who was formerly a machine salesman, and flew from Tokyo to Berlin on the Graf Zeppelin. Mr. Chadani is kneeling in true Japanese fashion, but the guests were provided with arm rests to enable them to sit sidewise. The six geisha girls acted both as waitresses and entertainers, the one on the right being the leader or chaperone. This is one of the finest tea houses in Tokyo and the party was typical of the way in which the machine industries entertained engineers from other lands.

At another dinner at the Navy Club given to Fred H. Colvin by the engineers of Tokyo and vicinity, each of the guests signed a scroll in both Japanese and English.

Walter Lee Cheney

Walter L. Cheney died August 15 at Meriden, Conn. Although not active for several years past owing to illness, he was well known in machine-tool circles for many years. Born in Greenfield, Mass., in 1854, he learned the machinist trade under Amos Whitney in Hartford, Conn., and then went to the Springfield Machine Tool Company, and later to Warner & Swasey Company. After a wide experience as shop executive in various lines of machine building he entered the field of sales engineering, being connected with the Lucas Machine Tool Company for the past quarter century. His straightforward methods made him many friends.

Mr. Cheney was also well known as a writer, being associate editor of "Machinery" in its early years and contributing to the *American Machinist* over a long period. He was one of the early members of the American Society of Mechanical Engineers and formerly took an active part in its work. The passing of Walter Cheney will bring both pleasant recollections and deep regret to his many friends, especially those who were privileged to know him best.

Economic Depression Affecting Europe—Even France Begins to Feel It

BY OUR PARIS CORRESPONDENT

THERE is little doubt but that the economic depression is settling down over Europe like a pall. France is feeling it no less than England and Italy. There is an undercurrent of opinion here, of a not too genial nature, that the European industrial world needs something more than Monsieur Briand's "United Economic Europe" to set the pace again. Great Britain and Italy, to say nothing of Germany, all look upon it as something demanding great skill and care in formulating and still more precaution in its operation—with bi-lateral reservations and tolerances—if the United States is not to be alienated completely.

There is significant comment in France over the Ford entry into the Italian automobile industry in association with the Isotta-Frachini Company, the more so in that an ultra-modern American machine-tool equipment is to turn out a product which, with the really clever and hard-working North Italian labor, will be sure to have a rebound in European markets where French makers themselves are seeking export trade in low-priced cars.

Unemployment has not yet made itself felt in France, but the German labor crisis, if employers and workers do eventually come to agreement on a reduced wage scale, is envisaged with foreboding. Germany is already securing, largely on a question of price, a far greater volume of trade in France than ever before, especially in small tools such as vices, pliers, and boring and grinding tools. Even the German makers of heavy-duty machine tools, through very efficient representation, are cutting in on what might otherwise be imports from America, as well as depressing the trade of French makers. French exports in these and co-related lines are also feeling the effects of this same increasing German activity, enforced as well by that of Great Britain and Belgium.

The automobile industry has been deceived, above all in that French exports have fallen greatly. Even an intensive world-wide propaganda campaign based on the slogan "Buy French" has not produced the desired or expected results in either the home or foreign market. For the moment the colonial market is considered by many here as the first best bid of French makers.

The seven great trunk railways have announced their joint reconditioning program to the end of 1931, calling for the expenditure of three billion francs a year for the next two years for locomotives and rolling stock. Plants have been running far below capacity for many months, hence it seems unlikely that any great volume of machinery or tool equipment will be required to meet these new demands, welcome indeed though they were to a languishing industry.

A report of the Syndical Chamber of Constructors of Railway Equipment states that two situations present themselves: (1) utilizing present productive capacities to the full by the employment of the necessary labor; (2) using only the available labor current in the plant with as much equipment in operation as may be possible. In either case it seems to suggest that no increased tool equipment is likely to be called for to meet the increased demand; rather that the work will be dragged out.

Further illustrating the situation the report states that annual productive capacity of locomotives is 1,200 units, while actual production is but 500 units. Passenger car and freight car productive capacity stand respectively at 1,800 and 32,000 units, whereas production only reaches 1,400 and 22,000 units. This suggests a too radical economy of machine-tool equipment, or would if a stabilized future volume of business were assured.

Wages in this branch of the metal transforming trades are stated to be 20 per cent in excess of the increase in living costs, based on gold values. Locomotive costs work out at approximately $340 per metric ton, as against $336 in 1913-14. The claim is made that the industry is not as profitable as it might be, though the worker is getting an increase which is not apparent in the cost of the finished product.

Monsieur M. Berger, the director of the International Bureau of Normalization, in a report to French automobile parts and accessory manufacturers on "The Industrial Policies of American Automobile Manufacturers," has nothing but flattering encomiums to offer as the result of the forty odd visits which he made recently to automobile plants in the United States.

Above all does he remark on the tendency of "manufacturers" to buy all possible fabricated or semi-fabricated parts of outside specialists. He suggests that it is in this way that the American automobile offers the ultimate purchaser so much for the money and argues that it is a policy which should be intensively developed in France.

A French colleague made the observation that "American automobile makers appeared to be only vulgar assemblers." This was a point of view to which, however, he did not subscribe, adding that such a snap judgment was unjustified and could lead to no logical conclusion if applied. He commented further on the fact that this same policy accounted for the rapid progress which had been made of late by the German industry.

Boye & Emmes Will Build

The Boye & Emmes Machine Tool Company, Cincinnati, Ohio, has let a contract for the construction of a new factory building to replace the present one. Because of the public improvements planned at the present site, the company was forced to vacate. The new plant will be larger than the present one, and will cost approximately $250,000.

Census Figures Show 1929 Aircraft Production Three Times That of 1927

PAUL WOOTON
Washington Correspondent

WASHINGTON, D. C., Aug. 27.—The Census Bureau turned back to a brighter page in the history of the aircraft industry this week to report that 1929 production totalled $61,973,079, practically three times that of the industry's 1927 output. The total for 1929 is made up as follows: Airplanes, 5,130, valued at $38,724,987, seaplanes and amphibians, 176, valued at $5,949,671; other complete aircraft, $639,990; parachutes, reported separately for the first time at 6,188, valued at $1,437,602; propellers, 14,184, valued at $2,040,299; airplane parts and engines made for sale as such, $8,187,285; repair and experimental work $3,387,269, and other products, $1,605,976.

The number of manufacturing establishments increased from 70 in 1927 to 117 in 1929. The number on the industry's payroll increased from an average of 4,422 to 9,856 in the two-year period and wages paid increased from $6,857,014 to $18,804,527. The percentage increase in wages was greater in proportion than the increase in the number employed, the amount of the payroll gaining 174 per cent and the number on the payroll 123 per cent.

Active proponent of industrial preparedness during his long term as assistant chief of ordnance, Brig. Gen. Colden L'H. Ruggles was relieved from duty Aug. 23 to await retirement on his own application. Brig. Gen. Ruggles has completed 44 years service, graduating from the Military Academy in June, 1890. He served during the World War as a brigadier general in the National Army.

BUSINESS ITEMS

The Pratt & Whitney Co., Hartford, Conn., has purchased the John-Sons Gage Works also of Hartford, according to an announcement by C. R. Burt, president and general manager of Pratt & Whitney. Arrangements are now being made to transfer all machine equipment and present stock to larger quarters in the Pratt & Whitney plant. The officials and working force of the gage works will be changed and the former products of that company will be marketed under the Pratt & Whitney name. C. M. Pond, director of the Pratt & Whitney Co., and manager of the Small Tools & Gage Divisions, will have direct supervision over the new branch.

Whitman & Barnes, Detroit, Mich., will have a working exhibit of Hercules Major drills, drilling high manganese steel, at the National Metal Exposition in Chicago.

VICTOR W. PETERSON
His presidency and general managership of the Shafer Bearing Corporation, Chicago, was announced in *American Machinist* on Aug. 14

The Taylor Instrument Companies of Canada, Ltd., Toronto, has been incorporated with $1,000,000 capital to take over the business of the Taylor Instrument Companies, Rochester, N. Y., in Canada. Offices will remain in the Tycos Bldg., Toronto, with A. H. Allen as manager, H. W. Payne in charge of manufacturing, and H. R. Smith as secretary.

The Link-Belt Co., Pacific Division, on Paul Ave., San Francisco, Calif., has completed a new plant consisting of a two-story office building, a three-story warehouse, and a manufacturing building containing the machine shop, steel shop and plant office. Elevating, conveying and power transmission machinery will be manufactured. Modern equipment is used throughout.

Tatro Bros., Inc., Decorah, Iowa, have taken a long time lease on a new and larger factory plant in Decorah and are preparing for expansion of output this season. Lyle Tatro is president and Dewey Tatro is treasurer and general manager.

The Grinnell Co. of the Pacific, a subsidiary of the Grinnell Co., is occupying its new offices, warehouse and plant at Elliott Avenue and Bay St., Seattle, Wash. F. B. DeLong is Pacific Coast sales manager. The new plant covers 134 x 306 feet, and represents an investment of $175,000.

Roku-Roku Shoten, whose address has been changed to 1 Ginza Nishi Sanchome, Kyobashi-Ku, Tokyo, Japan, has rebuilt its office to add an additional floor as a demonstration room for new machine tools.

The Cole Standard Grip-Nut Co., New York, has been incorporated with 200 common shares to deal in machinery parts.

The Ford Motor Co., Detroit, Mich., has purchased 60 acres, extending for 1,769 feet along the harbor line in Buffalo, N. Y., for the building of a new assembly plant to have a capacity of 400 cars a day, and to supplant the present Buffalo unit. The main plant will be 1,000 feet long and 320 feet wide. It will be one story high with a two-story portion along one side. It will employ approximately 2,500 men, and is expected to be ready for operation within a year.

The Reliance Electric & Engineering Co., 1042-1090 Ivanhoe Road, Cleveland, has moved its Boston office from 80 Federal St. to 89 Broad St. R. H. Smith will continue as district manager.

Plans for early increase of production at the Moline, Ill., branch of the Minneapolis-Moline Power Implement Co. were announced last week by W. C. McFarlane, Minneapolis, president, following his inspection of progress upon the $125,000 plant improvements instituted there. The improvement program is nearly completed. F. R. Brownlee, works manager in charge of the three factories operated by the concern, also visited the plant.

The Allis-Chalmers Mfg. Co., Milwaukee, is establishing a branch office and warehouse at Oakland, Calif., to be known as the West Coast branch, with C. J. Deutsch, formerly a supervisor of the Monarch tractor division of Allis-Chalmers at Springfield, Ill., as manager. The branch will serve California, western Nevada, and western Arizona.

The Bump Manufacturing Co., La Crosse, Wis., a $200,000 corporation, which recently took over the business of the Bump Paper Fastener Co., 1830 West Ave. South, will also build a pump designed by George P. Bump. W. J. Ferris becomes president of the organization, Myron D. Savage, vice-president and general manager, and Earl Olson, works manager.

The A. M. Byers Co., Pittsburgh, is preparing to abandon its plants at Girard, Ohio, and concentrate all operations at Ambridge, Pa., near Pittsburgh, where it has built a new plant.

The Borden Co., Warren, Ohio, will now carry in stock dies for all sizes of "Beaver" tools ground specially for threading brass pipe. For easy identification, these dies will be copper plated and stamped "For Brass Pipe."

The Driver-Harris Co., Harrison, N. J., has been granted a melting license by the Krupp-Nirosta Co., Watervliet, N. Y., for the production of Nirosta Steel in the form of castings, rods, sheet, strip and wire. Some of this material will probably be exhibited in the Driver-Harris booth at the National Metal Congress in Chicago.

Southern Steel Stampings, Inc., Winston-Salem, N. C., has been incorporated with $100,000 capital by L. W. Lawrence, 1149 Fourth St.

The Torrington (Conn.) Co., held its annual meeting Aug. 15 and re-elected officers. W. R. Reid is president and C. B. Vincent vice-president. The annual meeting of the Torrington Co. of Maine is scheduled for September.

The firm of Gazley & LaSha has been reorganized as the National Aircraft Engineering Corporation, Washington, D. C., since R. C. Gazley withdrew to become chief engineer of the Aeronautics Branch, Commerce Department, and S. S. LaSha went with him as assistant chief. The Washington office and personnel of the old company will be retained. H. W. Barlow is president and T. C. Mayo is vice-president.

The Moline (Ill.) Iron Works has elected L. E. Nutt president, B. V. Nutt vice-president, M. C. Nutt vice-president and secretary, and J. T. Miles treasurer.

The Power Plant Engineering Co., a division of the Petroleum Heat & Power Co., New York, is building a new sales and service and warehousing building at East 13th & Burnside Sts., Portland, Ore. The building is 50x90 ft., of concrete.

Authorized capitalization of the Frank Foundries Corporation, Davenport, Iowa, has been increased from $250,000 to $350,000, by amended articles filed last week with A. E. Hageboeck, president, and Tom Frank, secretary. The new capital is represented in 3,000 shares common and 500 shares preferred, each of $100 par.

Thrall Taylor Distributors, Ltd., 3350 San Fernando Road, Los Angeles, Calif., representing several local and Eastern manufacturers, has recently been organized J. R. Stone, formerly superintendent of the Kinner Airplane & Motor Corporation, Glendale, Calif., is president and Frank J. Thrall, formerly of Detroit, Mich., is secretary and treasurer. The company also maintains a plant for light manufacturing and the building of special tools, jigs, and fixtures.

R. L. Roberts, Ltd., has been organized in San Francisco for the purpose of manufacturing "Ra-Lumin-Ex," an alloy composed principally of aluminum. The factory is located at 360 Bryant St.,

and offices at 965 Russ Bldg. An investment of approximately $36,000 has been made, which includes cost of building, land and machinery.

British Can Shares, Inc., has been formed under Delaware laws by interests of the American Can Co., the Thermokept Corporation, and others, to acquire a substantial stock interest in the British Can Co., Ltd.

The Griffen Wheel Works has appointed T. C. Weiser, formerly of Boston, Mass., as superintendent of the Council Bluffs, Iowa, plant, succeeding F. J. Head. Mr. Head has been transferred to the St. Paul, Minn., factory.

The Newark (N. J.) Foundrymen's Association has announced meeting dates as follows: Oct. 22, Dec. 3, Jan. 28, Mar. 25 and May 27. H. L. Evinder of the Barnett Foundry & Machine Co., Irvington, N. J., is chairman of the program committee.

The Inland Steel Co., First National Bank Bldg., Chicago, has completed its new merchant bar mill which has been under construction for more than a year at the Indiana Harbor (Ind.) Works. This is Inland's third bar mill at this plant. Finishing on 10-in. rolls, this mill is equipped to produce the smaller sizes of rounds, flats, squares and shapes, as well as bands, down to a No. 12 gage and coiled material.

The Carborundum Company, Niagara Falls, N. Y., whose purchase of the abrasive division of the American Glue Co., was announced recently, has named the new organization the Union Sand Paper Division of the Carborundum Company. The main office of this division will continue at 121 Beverly St., Boston, Mass.

The Stover Manufacturing & Engine Co., Freeport, Ill., has taken over the Swartz Manufacturing Co., Inc., also of Freeport.

The Johnson Gas Appliance Co., Cedar Rapids, Iowa, has formed a connection with The Eastern Service Co., 250 Stuart St., Boston, Mass., for the Eastern representation of its direct jet gas appliance. R. M. Henshaw, formerly Eastern representative, has joined the latter company to take charge of sales of these appliances.

The Ritchie family has disposed of its majority interests in the Ritchie Manufacturing Co., 604-10 South Twelfth Ave., Marshalltown, Iowa, to L. W. Browne and Jacob Eige, Fisher Governor Co., and Ralph C. McCague, manager of the Kiowa Corporation, all minority stockholders. Mr. Browne is the new president, Mr. Eige, vice-president, and Mr. McCague, secretary-treasurer.

The Weather-Proof Body Corporation of Owosso and Corrunna, Mich., has purchased control of the Burwood Products Co., Port Huron, and will move the equipment to Owosso, according to E. C. Morine, president.

The Gopher Thresher Manufacturing Co., Minneapolis, Minn., has purchased the motor plant of the former Pandolfo Manufacturing Co., St. Cloud, Minn.

The Davis Emergency Equipment Co., Ltd., with headquarters in New York City, has established western headquarters at 1268 Mission St., San Francisco, Calif. A complete stock of safety equipment is carried there and the eleven Western states will be served from this new branch. The concern was formerly represented in San Francisco by the Bullard-Davis Co. of California. Herbert Brendlen, vice-president, will be in charge.

The Canadian Steel Corporation, Ltd., of Ojibway, Ontario, has under construction a plant for the coating of black plate and black sheets with tin and zinc, to produce tin plate and galvanized sheets, having a capacity of 1,200,000 base boxes of tin plate and 30,000 tons of galvanized sheets per annum. It is reported that the plant will cost approximately $1,700,000 and will give employment to 400 men.

The Dominion Iron & Steel Co., receivership, which has been in the hands of the National Trust Co. for the past four years, has been lifted, and the Dominion Coal & Steel Corporation has formally taken over operation of the steel plant at Sydney, Nova Scotia. M. T. Brocklebank, resident manager of the National Trust Co., will remain at Sydney for several months.

Articles of incorporation have been filed with the secretary of state of Indiana by the Faris Pump & Manufacturing Co., Inc., having a principal place of business in Indianapolis. The company has operated on a small scale for about two years and manufactures electrically operated water pumps. The incorporation is a preparatory move toward enlargement of the corporation, officials said. Incorporators are Earl L. Faris, William C. Faris, and Elvin E. Faris.

Officials of the Standard Steel Co., a Pennsylvania corporation have filed papers with the secretary of state of Indiana, qualifying the corporation to transact business in the state. Ralph E. Wagner, Hammond, Ind., is named state agent. The company manufactures finished steel specialties.

The International Nu-Typ Tool Corporation has been chartered at Oswego, N. Y., with a capital of $300,000 in preferred and $82,500 in common stock, to take over the business and assets of the Oswego Tool Co. Principals of the new firm are Benjamin E. Shove, Camillus, N. Y., Morris Berman, and H. Paul Nelligan. The company will engage in the production of various tools, automobile parts, machinery and machines.

Western headquarters have been established in San Francisco at 469 Bryant St., by the Aeroil Burner Co., Inc., with head office and factory in West New York, N. J. A complete stock of products will be carried at the San Francisco headquarters. R. M. Starner, formerly representative in San Francisco, is Pacific Coast manager.

The Ryan Aircraft Co., a division of the Detroit Aircraft Corporation, has moved from St. Louis to Detroit, according to Edward S. Evans, president of the Detroit company. The St. Louis plant will become a service station.

Alloy Welding Processes, Ltd., Ferry Lane Works, Forest Road, Walthamstow, London, E. 17, England, has been purchased by Murex Limited, Rainham, Essex, which also owns all the capital of the Premier Electric Welding Co., Ltd., and that of Thermit Ltd. The Premier works will be removed to the Alloy works shortly.

The Industrial Plants Corporation, 25 Church St., New York City, has been appointed auctioneer to sell at public auction all land, buildings, machinery, and equipment of Syracuse (N. Y.) Perfection Castings, Inc. (successors to to the Smith Wheel, Inc.), at Erie Boulevard and Geddes St.

The Gulf States Steel Co., Birmingham, Ala., has begun production of sheared and universal plate after the recent completion of their new plant. Gulf Steel is the only independent steel company in the South manufacturing plate.

Western headquarters have been established at 1000 Capp St., San Francisco, Calif., by the Miller Tool & Manufacturing Co., Detroit, Mich., manufacturers of special service tools for automobiles. All the territory west of Salt Lake City and from Canada to Mexico will be served from this headquarters. W. W. Leathers is Pacific Coast manager.

The Clark Airplane Corporation has been granted a charter for organization at Ponca City, Okla. The organization, of which Richard D. Clark is head and with which Charles E. Reed and George McPhail are connected in executive positions, is to begin immediate erection of their factory at Ponca City for the manufacture of several new aeronautic inventions of Mr. Clark. Authorized capitalization is $50,000.

The Safety Equipment Service Co., 1228 St. Clair Ave., N.E., Cleveland, Ohio, has been appointed National Distributors of "E-Z" Anchor Bolts. Complete stocks in a range of popular sizes will be maintained at the office and factory.

Dingwall Motors, Ltd., Dryden, Ont., has been incorporated with $50,000 capital to manufacture and deal in automobiles, engines, and machines.

The Michigan Steel Corporation has completed the erection of steel work for plant expansion at its mill in Ecorse, Mich.

The recently organized Auto Craft Radio Co., Chicago, has leased the building at the northwest corner of 28th St., & South Michigan Ave.

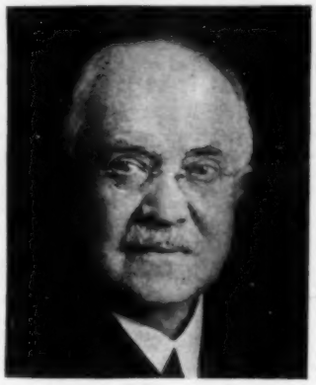
The C. H. Will Motor Corporation, Minneapolis, Minn., is building a factory for manufacturing and assembling motor buses at Oakland, Calif. The building will cost approximately $50,000 and will be 125x200 ft.

PERSONALS

J. B. Jackson, recently director of the general staff and director of the research laboratories of the General Motors Corporation, has been made general manager of the Jaxon Steel Products Co., a division of General Motors.

Frederick H. Low has joined the King Refractories Co., Buffalo, N. Y., as secretary and general manager.

E. C. Gainsborg, formerly Pittsburgh representative of SKF Bearing Co., subsidiary of the SKF Industries, Inc., Hartford, Conn., has been appointed Pittsburgh district manager of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.



WALTER L. CHENEY

Whose death is announced on page 380a of this issue of *American Machinist*

Albert C. Cook, vice-president of the Warner & Swasey Co., Cincinnati, Ohio, resigned on July 31. Mr. Cook has not announced his future plans.

William C. Durant, founder of the General Motors Corporation, has returned to active leadership of Durant Motors, Inc., according to a recent announcement. Mr. Durant signed contracts for the manufacture in Detroit of the Mathis, a French automobile of midget size, shortly after his election.

E. C. Wilson was recently appointed assistant sales manager of the Foote Bros. Gear & Machine Co., Chicago. Mr. Wilson was formerly in charge of the pricing group of the Gear & Reducer Division and until 1929 was assistant sales manager of R. D. Nuttall Co.

L. L. Warriner, manager of factories of Fairbanks, Morse & Co., Beloit, Wis., has resigned effective Jan. 1, to become vice-president in charge of manufacturing of the Master Electric Co., Dayton, Ohio. Mr. Warriner has been associated with Fairbanks, Morse for 13 years. He had general supervision of the plants at Beloit, Wis., Three Rivers, Mich., and Indianapolis, Ind.

James L. Williams has been appointed general manager of sales of the Taylor-Wilson Manufacturing Co., Pittsburgh.

I. W. Turner, formerly with Ingersoll-Rand Co., at the New York sales office, has been appointed to the New York sales office of the Pittsburgh (Pa.) Valve, Foundry & Construction Co.

Karl W. Hawk, Bridgeport, Conn., for the past 10 months plant engineer of Harvey Hubbell, Inc., Bridgeport, has been appointed plant manager.

Dr. Albert Sauveur, professor of metallurgy and metallography at Harvard University, has been announced as chairman of the meeting of the American Society for Steel Treating in Chicago on Wednesday morning, Sept. 24, during the National Metal Congress. The annual Campbell Memorial Lecture will be given at this time by Dr. M. A. Grossman, Republic Steel Corporation, Massillon, Ohio, who will discuss "Oxygen in Steel."

OBITUARIES

Albert H. Overman, 80, formerly president of the Overman Wheel Co., Chicopee, Mass., died on July 30, at Westmoreland, N. H. He was president of the cycle company for 20 years.

Arthur S. Holmes, 55, president of the Holmes Engineering Co., Oshkosh, Wis., died recently following a heart attack.

FORTHCOMING MEETINGS

THIRD INTERNATIONAL CONGRESS FOR APPLIED MECHANICS — At Stockholm, Sweden, Royal Technical Institute, week of Aug. 25. Further information from A.S.M.E., 29 West 39th St., New York City.

INTERNATIONAL CONGRESS FOR GENERAL MECHANICS — Liege, Belgium, Aug. 31 to Sept. 7. For information address Alb. Schlag, 4 Place Saint Lumbert, Liege, Belgium.

STEEL FOUNDERS' SOCIETY OF AMERICA, INC.—Regular meeting, William Penn Hotel, Pittsburgh, Pa., Sept. 10-11. October meeting at Pennsylvania Hotel, New York City, on Oct. 23, the day preceding the New York meeting of the American Iron & Steel Institute. G. P. Rogers, 932 Graybar Bldg., New York City, is managing director.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION—Annual convention, Hotel Sherman, Chicago, Sept. 10-12.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION—Cost Conference, Hotel Clifton, Niagara Falls, Ont., Canada, Sept. 22-23. Ernest F. DuBrul, 1415 Enquirer Bldg., 617 Vine St., Cincinnati, Ohio, is general manager.

NATIONAL METAL CONGRESS—Twelfth annual Congress and Exposition, Stevens Hotel, Chicago, Sept. 22-26. W. H. Eisenman, secretary of the A.S.S.T., 7016 Euclid Ave., Cleveland, Ohio, is director.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Calvin W. Rice, executive secretary, Engineering Societies Bldg., 29 West 39th St., New York, N. Y. The following meetings are scheduled:

Iron & Steel and Machine Shop Practice Divisions, annual fall meetings, Stevens Hotel, Chicago, Sept. 22-26. Address P. T. Wetter at above address.

French Lick Meeting, French Lick Springs Hotel, French Lick, Ind., Oct. 13-15.

Fifty-first annual meeting, Engineering Societies Bldg., Dec. 6.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of Iron & Steel and Institute of Metals Divisions, Stevens Hotel, Chicago, Sept. 22-26. T. T. Read, Engineering Societies Bldg., 29 West 39th St., New York City, is secretary.

AMERICAN WELDING SOCIETY—Annual fall meeting, Congress Hotel, Chicago, September 22-26. W. M. Spraragen, 29 W. 39th St., New York, N. Y.

AMERICAN SOCIETY FOR STEEL TREATING—Annual Convention, Stevens Hotel, Chicago, September 22-26. W. H. Eisenman, 7016 Euclid Ave., Cleveland.

NATIONAL SAFETY CONGRESS—Nineteenth Annual, to be held at Fort Pitt and William Penn Hotels, Pittsburgh, from Sept. 29 to Oct. 3. Metals Section meetings will be held on Tuesday and Wednesday mornings and Thursday afternoon.

AMERICAN GEAR MANUFACTURERS' ASSOCIATION — Semi-Annual meeting, Hotel Clifton, Niagara Falls, Ont., Canada, from Sept. 29 to Oct. 1.

SOCIETY OF AUTOMOTIVE ENGINEERS — Production meeting, Hotel Book-Cadillac, Detroit, Oct. 7-8. R. S. Burnett, director, production activities, 29 West 39th St., New York City.

GRAY IRON INSTITUTE, INC. — Third Annual Convention at Hotel Cleveland, Cleveland, Ohio, October 8. Arthur J. Tuscany, Terminal Tower Bldg., Cleveland, is manager.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION—29th Annual Convention, Hotel Aspinwall, Lenox, Mass., October 13-15. Ernest F. DuBrul, 1415 Enquirer Bldg., 617 Vine St., Cincinnati, Ohio, is general manager.

SOCIETY OF INDUSTRIAL ENGINEERS—17th National Convention, Mayflower Hotel, Washington, D. C., Oct. 15-17. George C. Dent, 1815 Engineering Bldg., 205 W. Wacker Drive, Chicago, executive secretary.

NINTH NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING —In Grand Central Palace, New York City, Dec. 1-6.

WESTERN METAL CONGRESS AND EXPOSITION—Second National, Civic Auditorium, San Francisco, Calif., Feb. 16-20, 1931. Under auspices of A.S.S.T. W. H. Eisenman, secretary, 7016 Euclid Ave., Cleveland, Ohio.

THE INDUSTRIAL REVIEW

Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

CLEVELAND

With the month of September just around the corner, the machine-tool industry as a whole is anxiously waiting to see what the next four months will bring. At the present time there are very few concrete indications that an upturn is in the making.

Sales for August were just as poor as those for July and June. Business is in a complete state of coma as far as buying is concerned. Inquiries are light and usually for single tools and replacements. A few orders were received from concerns in the automotive industry. General machinist and industrial users are the principal buyers at the present time.

CINCINNATI

A small portion of the machine-tool manufacturers of the Cincinnati district noted at least some improvement in business during the past week, but with the majority there was no noticeable change. Selling agents found users in local and adjacent territory a little more interested in new equipment than they have been for some time.

In the course of the week there were occasional orders for two or three pieces of equipment, but in the main the business was made up of single tools and replacements.

There was a slight increase in the number of inquiries received, the greater portion coming from general machinists and miscellaneous users, whose requirements were largely confined to single tools and replacements.

PHILADELPHIA

Except for a few spots where prospects for early orders appear to be bright, the machinery and machine-tool trade continued to mark time during the last two weeks. The sales department of one of the largest producers in this section reported substantial prospects for sales which may materialize soon, or their consummation may be deferred for some months. Inquiries are for industrial equipment from a wide area.

Little is expected in this market from the radio or aircraft industry for the present, and in the railroad and automotive lines there are few prospects of activity.

BUFFALO

Machine-tool dealers in the Buffalo district report a slight improvement in inquiries but no real improvement in business in hand. A few of the dealers are pessimistic, but most of them have hopes.

Most of the inquiries are for single pieces of equipment. The Buffalo school administration is spending considerable money in equipping the new Burgard Vocational School. Bids have been filed in most cases and it is reported that contracts will be let about Oct. 1. These cover equipment, not only in the machine-tool trade, but everything necessary for vocational instruction in about 22 different trades.

In the electrical field, conditions differ little from those in the machine-tool field. If anything the manufacturers' representatives and dealers are even more pessimistic.

AS A New York dealer puts it: "Inquirers are beginning to get ready to commence to start in to think about the possibility of doing something about things," but so far it has been all smoke and no fire. New York dealers, expecting nothing, were pleasantly surprised with the recent American Locomotive inquiry for some 15 miscellaneous tools for the Schenectady and Auburn, N. Y., plants of the company and a subsidiary.

CLEVELAND dealers are playing peek-a-boo with the possibility of better business just around the corner. Meanwhile, conditions are as they have been for some months. Cincinnati has a few builders who have concrete evidence of improvement in the shape of increased inquiries and some orders, but the majority consider the sales curve a straight line at the bottom of the graph. Philadelphia dealers are marking time. Air, land, and sea transport builders show little interest, and judging by radio builders' plans, even Amos 'n' Andy are not doing so well.

BUFFALO dealers have a few members singing the pessimistic blues, but the majority are clearing their throats to sing peans of progress, even though present prospects include only a chance at some school business. New England's Yankee dealers are saying little, but orders there are becoming less of a curiosity, and the business barometer indicates fair weather. Milwaukee, remembering pre-Volstead prosperity, considers current business spotty, but hopes for a repeal. Chicago is quiet—strangely. Detroit has little to add.

DETROIT

The machinery market is still in the same state of depression that has characterized it for the past ten months and there are no tangible evidences of improvement. It is still true that a definite feeling of optimism exists, but there is little to base it on.

Dealers are receiving almost no orders and very few inquiries, automobile plants are running at half time or less and with only a small proportion of their normal crews and business in general is in a sluggish state. The August revival that was expected.

NEW ENGLAND

General business conditions in the New England territory continue to develop favorable aspects. From an order standpoint the machine-tool industry has not benefited from these various changes for the better. Important orders are comparatively few, most orders being for single machines. Inquiries of the week showed no particular change in volume or importance.

Industrial improvement is evident in a number of manufacturing centers. This is perhaps the sole barometer on which Fall improvement in the machine-tool industry is based. Valve manufacturers report a strong demand. One manufacturer resumed operations this week on a 5½-day schedule.

MILWAUKEE

Reports indicate a better and sounder tone with an undercurrent of real optimism, but manufacturers and selling agents on the whole are marking time and awaiting further developments. Current business is spotty and is confined to small items.

Machinery and machine-tool business for August will show a slight improvement over July, according to some manufacturers, who say that each month since the low period of April has been somewhat better. Others report a falling off in both inquiries and orders during the last two months.

Negotiations between the Allis-Chalmers Manufacturing Co., Milwaukee, and the Amtorg Trading Co. for the sale of a large order of tractors and farm equipment for the Soviet have fallen through, according to executives of the tractor division. It is understood that conditions attached to the sale were not satisfactory to the Milwaukee firm. Recently the International Harvester Co. accepted a large order from Amtorg for tractors manufactured at the Milwaukee division of the International.

NEW YORK

A list of about 15 tools, the largest in two months, has been the principal topic of conversation in New York machinery and machine-tool markets during the week. American Locomotive is inquiring for these turret lathes, production lathes, radials, grinders, and other tools for plants at Schenectady and Auburn, N. Y., the latter being the plant of a subsidiary, Mackintosh Seymour. Only a few of the tools are to be bought at once, according to reports. Other inquirers are "beginning to get ready to commence to start in to think about the possibility of doing something about things," in the words of one dealer, and this is an accurate picture of the situation. Sales are few and far between, and are expected to stay that way until after Labor Day at the very earliest.

CHICAGO

No change indicating improvement in machine-tool market conditions is reported from any source. Except for the occasional closing of a transaction here and there the situation is monotonously dull. The belief is expressed, however, that with the coming of September there will be a change for the better, and that some of the inquiries pending, several of them for months, will be brought to a head. Inquiries for single tools, principally for replacement use, continue to be received, but not in increasing number. No new lists are noted within the last week. The Chicago Board of Education has closed on a few of the items contained in recent inquiries. Demand for used tools is reported fair, but not normal.

BUSINESS • BAROMETER

Nothing but the prevailing pessimism should cause depression, and that will soon be dissipated

THEODORE H. PRICE
Editor, Commerce and Finance, New York

AN OLD Negro who was bravely suffering the pain of rheumatism is said to have remarked that "it is better to have some misery with your happiness than to be miserable without being happy."

Among the business men and bankers of America there are many who seem to have adopted the old darkey's philosophy. They admit that great prosperity is in store for America, but just at present they seem to have included a modicum of pessimism in their digest of the situation.

If asked to explain their attitude they would probably answer that it is a reflex of the prevailing view. No one will deny that the resources of America are as great as they ever were, and that the enterprise and capital upon which their development depends are undiminished. Therefore, it would seem that a change of sentiment is inevitable and that it will probably make itself felt just as soon as the forces of construction and re-construction are unleashed.

President Hoover did good work in this direction by calling a conference of governors at Washington. One result of this conference is that $120,000,000 of government money, appropriated for road-building, will be made immediately available to the states that have made similar appropriations.

The other public work that the United States Government is authorized to undertake is also being pushed, and the accelerated circulation of money thus assured is a factor which should not be ignored.

A slight change in the temper of the commodity markets is also noticeable. The decline in grain which was halted by the drought has made the bears cautious, and a slight recovery in the cotton market has led many to consider buying December contracts when they could be had at under 11 cents a pound.

Freight car loadings may perhaps supply us with dependable information, but the value of the figures submitted by the railroads is also somewhat impaired by the crop shortage attributable to the drought. The decrease in car loadings announced last week seems to reflect chiefly the reduction in miscellaneous shipments that a crop failure would cause. It is for this reason the most sinister feature of the situation. If September does not show some improvement, then the railroads will have a hard winter to face. Car loadings should therefore be carefully watched. The total for the week ended Aug. 9 was 904,158 cars, against 1,092,154 for the corresponding week in 1929.

But these figures seem to have been disregarded on the New York Stock Exchange, where the market has shown a distinct improvement in tone, and prices are, if anything, higher than they were a week ago. If it be true that the shadows of coming events are to be discerned in the stock market, then the recovery of last week might be regarded as highly significant.

It may, however, be wise to await the opening of the autumn season before assuming that anything like a boom is ahead of us. The money that is being spent and the work that is being done to relieve the distress caused by the drought certainly should have a quickening effect upon business, but it will take time to manifest itself, and patience in awaiting results will be necessary.

Money is slightly firmer, but it is still in abundant supply on call at 2½ per cent, and those who will have any use for borrowed credit during the autumn are urged to supply their requirements now, for it is always safe to borrow money when it can be had at such abnormally low rates. It is astonishing how quickly a super-abundant supply of funds will be absorbed when there is a change in the view that business men take of the future.

The news from abroad is also encouraging. There appears to be some increase in the number of unemployed, but the dole is largely responsible for this, and economic conditions overseas are more placid than they have been in years. The fact that Gandhi and the British Government appear to be approaching an understanding with regard to the dominion status of East India is highly important. If political tranquillity should be the consequence, the result might be amazing, for few of us can measure the effect upon the world's trade that even a slight increase in the purchasing power of India's immense population would have.

In this country there is much talk of unemployment, and some of the newspapers are actively exploiting the alleged distress. In New York there is always more or less unemployment, but the unemployed are not generally very eager for work, and but few authenticated cases of suffering have as yet come to light.

Our larger cities always attract a good many itinerant workers, who are very "choosey" as to the jobs that they will take, and who rely upon the philanthropy of the community when their needs become urgent. In the rural regions and the smaller towns there appears to be work for most of the men and women who are industrious.

President Hoover is, however, showing sound judgment in his efforts to provide all those who are out of work with jobs, and we ought to be able to see the effect of his program within two or three weeks. Certainly there is nothing but the prevailing pessimism that should cause any depression, and signs that this pessimism will soon be dissipated are always discernible.

THE BUSINESS WEEK

August 27, 1930

BUSINESS apparently hit a second bottom at the beginning of August, just a year after it went over the top in 1929. Since then little change, but indications that a slow up-pull has set in. Our index, with its final figures steady at 86.5% of normal for two weeks, rose a trifle to 86.9% this week. Last year it came down quite a peg to 111.5%, beginning its swift slide. . . . Industrial activity is still stagnant, but has reached resistance levels, despite the astonishing slackness of seasonal forward buying in wholesale lines which is leaving retail shelves bare. General trade, discounting drought doubts, has freshened since the first of the month. Commodity prices are decidedly firmer. Bears have made little headway in any markets. Whether the business recovery from now on is to be slow or fast, only seasonal or permanent, is now chiefly a question of revival of individual initiative and aggressiveness which has been weakened in the past few months by repeated disappointment in miracles and by defeatist doctrines. Business may be slack, but business men are slacker.

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THE WEEKLY PRICE GUIDE . . . .S

Rise and Fall of the Market

IRON buyers are taking material in small lots, endeavoring to keep yard-stocks down. Inquiry has improved in the last week for tank and ship plates, shapes and reinforcing material. Automotive and railway buying continues light. Counteracting the declines of the week, which occurred in steel sheets (except black), comes a jump in heavy melting scrap, of 50c. per ton, to $15.75, Pittsburgh. Aside from softening in price of scrap crucible copper, changes for the week in non-ferrous materials and supplies were negligible. The market for copper is quiet, that for tin also is in a rut, while concessions on zinc are easier to obtain than a week or more ago. Lead demand, on the other hand, continues steady.

(*All prices as of August 22, 1930*)

IRON AND STEEL

PIG IRON—Per gross ton, f.o.b.:

CINCINNATI	
No. 2 Southern (silicon 1.75@2.25)	$16.69@$18.19
Northern Basic	19.89@ 20.39
Southern Ohio No. 2	19.89@ 20.39
NEW YORK—Tidewater Delivery	
No. 2 Southern (silicon 1.75@2.25)	18.00@ 18.50
BIRMINGHAM	
No. 2 Foundry (silicon 1.75@2.25)	14.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	20.00
Virginia No. 2	18.75@ 19.25
Basic	22.29
CHICAGO	
No. 2 Foundry, local (silicon 1.75@2.25)	19.00
No. 2 Foundry, Southern (silicon 1.75@2.25)	18.20
PITTSBURGH, including freight charge ($1.76) from Valley:	
No. 2 Foundry	19.63@ 20.13
Basic	19.63@ 20.13
Bessemer	20.76

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.50
Cleveland	5.00
Cincinnati	4.50
New York	5.25
Chicago	4.50@4.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots:

Blue Annealed*	Pittsburgh Mill Base	Chicago	Cleveland	New York
No. 10	1.90@2.00	3.35†	3.00	3.40†
No. 12	1.95@2.05	3.45†	3.10	3.45†
No. 14	2.05@2.15	3.55†	3.20	3.50†
No. 16	2.15@2.25	3.65†	3.30	3.60†
Black				
Nos. 18 to 20	2.25@2.35	3.85†	3.40	3.70
No. 22	2.40@2.50	4.00†	3.55	3.85
No. 24	2.45@2.55	4.05†	3.60	3.90
No. 26	2.55@2.65	4.15†	3.70	4.00
No. 28	2.70@2.80	4.75†	3.85	4.15
Galvanized				
No. 10	2.35@2.40	3.90†	3.65	3.55
Nos. 12 to 14	2.45@2.50	4.00†	3.75	3.65
No. 16	2.55@2.60	4.10†	3.85	3.75
No. 18	2.70@2.75	4.25†	4.00	3.90
No. 20	2.85@2.90	4.40†	4.15	4.05
No. 22	2.90@2.95	4.45†	4.20	4.10
No. 24	3.05@3.10	4.60†	4.35	4.25
No. 26	3.30@3.35	4.85†	4.60	4.50
No. 28	3.55@3.60	5.10†	4.85	4.75

*Light Plates. †400 to 3,999 lb.

WELDED STEEL PIPE—Warehouse discounts are as follows:

	New York		Cleveland		Chicago	
	Black	Galv.	Black	Galv.	Black	Galv.
1 to 3 in. butt..	56.14%	43.6%	53.3%	42.3%	57.3%	44.8%
3½ to 6 in. lap..	52.72%	40.18%	50.8%	37.8%	53.9%	41.4%

WROUGHT-STEEL PIPE LIST

Size, Inches	List Price per Foot	Diameter in Inches External	Diameter in Inches Internal	Thickness Inches
1	$0.17	1.315	1.049	.133
1¼	.23	1.66	1.38	.14
1½	.27½	1.9	1.61	.145
2	.37	2.375	2.067	.154
2½	.58½	2.875	2.469	.203
3	.76½	3.5	3.068	.216
3½	.92	4.0	3.548	.226
4	1.09	4.5	4.026	.237
5	1.48	5.563	5.047	.258
6	1.92	6.625	6.065	.28
8	2.50	8.625	8.071	.277

SEAMLESS STEEL TUBING—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

Thickness—Decimal	B.w.g. and Fractions	Outside Diameter in Inches ⅛	¼	⅜	½	¾	1	1¼	1½
		Price per Foot							
.035"	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23	
.049"	18	.17	.18	.19	.20	.21	.23	.25	
.065"	16	.19	.20	.21	.22	.23	.25	.27	
.083"	14	.20	.22	.23	.24	.25	.27	.29	
.095"	13	.21	.23	.25	.26	.27	.29	.31	
.109"	12	.22	.24	.26	.27	.28	.30	.32	
.120" or .125"	11	.23	.25	.27	.28	.29	.31	.33	
.134"	10	.24	.26	.28	.29	.30	.32	.34	

MISCELLANEOUS—Warehouse base prices in cents per lb.:

	New York	Cleveland	Chicago
Spring steel, light*	4.50	4.65	4.65
Spring steel, heavier	4.00	4.00	4.00
Coppered Bessemer rods	7.00	6.00	6.20
Hoop steel	3.75†	4.00	3.75†
Cold rolled strip steel	4.95	6.00	6.10
Floor plates	4.85†	5.30	5.00†
Cold fin., round or hexagon‡	3.40	3.65	3.35
Cold fin., flat or square‡	3.90	4.15	3.85
Structural shapes	3.10†	3.00	3.00†
Soft steel bars	3.10†	3.00	3.00†
Soft steel bar shapes	3.10†	3.00	3.00†
Soft steel bands	3.40†	3.65	3.20†
Tank plates	3.10†	3.00	3.00†
Bar iron (2.75 at mill)	3.24	3.00	3.00
Drill rod (from list)	60%	55%	50%

*Flat, $\frac{3}{16}$-in. thick by $\frac{3}{4}$-in. wide. †400 to 3,999 lb., ordered and released for shipment at one time. ‡Cold finished steel, shafting and screw stock.

Electric welding wire at New York warehouse—$\frac{3}{32}$, 8.35c. per lb.; $\frac{1}{8}$, 7.85c. per lb.; $\frac{5}{32}$ to $\frac{1}{4}$, 7.35c. per lb.

METALS

Warehouse Delivery Prices in Cents Per Lb. for Small Lots:

Copper, electrolytic, New York			12.50
Tin, Straits, pigs, New York			32.50@33.50
Lead, pigs, E. St. Louis	5.35	New York	6.50@ 7.00
Zinc, slabs, E. St. Louis	4.30	New York	6.25@ 7.25

	New York	Cleveland	Chicago
Antimony, slabs	10.00@10.50	10.25	10.75
Copper sheets*	20.75	20.75	20.75
Copper wire*	13.00	13.87½	13.12½
Copper, drawn, round*	19.25	19.25	19.25
Copper tubing*	23.00	23.00	23.00
Brass sheets, high*	17.87½	17.87½	17.87½
Brass tubing, high*	22.75	22.75	22.75
Brass rods, high*	16.12½	16.12½	16.12½
Brass wire, high*	18.37½	18.37½	18.37½

*Mill, base.

SHOP MATERIALS AND SUPPLIES

METALS—Continued

	New York	Cleveland	Chicago
Aluminum ingots, 99%†	23.30	24.30	23.30
Zinc sheets (casks)	9.75@10.25	11.25	10.11
Solder (½ and ½)	24.50	23.50	22@24
Babbitt metal, delivered in case lots, New York, cents per lb.:			
Genuine, highest grade			50.00
Commercial genuine, intermediate grade			37.00
Anti-friction metal, general service			31.00
No. 4 babbitt, f.o.b.			10.50

†F.O.B.

NICKEL AND MONEL METAL—Price in cents per lb., base, f.o.b. Huntington, W. Va.:

	Nickel	Monel Metal
Sheets, full finished	52.00	42.00
Sheets, cold rolled	60.00	50.00
Strip, cold rolled	55.00	45.00
Rods, hot rolled	45.00	35.00
Rods, cold drawn	50.00	40.00
Tubing	75.00*	90.00†
Angles, hot rolled	50.00	40.00
Plates	52.00	42.00

*Seamless. †Welded.

OLD METALS—Dealers' purchasing prices in cents per pound, f.o.b. cars:

	New York	Cleveland	Chicago
Crucible copper	8.75@9.00	9.00	8.75@ 9.25
Copper, heavy, and wire	8.25@8.50	8 75	8.00@ 8.50
Copper, light, and bottoms	7.25@7.75	8.50	7.00@ 7.50
Heavy lead	4.00@4.12½	4.00	3.50@ 4.00
Tea lead	2.00@2.25	2.50	2.50@ 3.00
Brass, heavy, yellow	5.00@5.25	5.00	5.00@ 5.50
Brass, heavy, red	7.25@7.50	7.75	7.25@ 7.75
Brass, light	4.00@4.25	4.00	4.50@ 5.00
No. 1 rod-brass turnings	5.00@5.25	5.00	5.00@ 5.50
Zinc	2.00@2.25	1.50	1.75@ 2.00

TIN PLATES—Charcoal—Bright—Per box:

"AAA" Grade:	New York	Cleveland	Chicago
IC, 14x20	$12.10	$11.95	$11.50
"A" Grade:			
IC, 14x20	9.70	9.90	9.50
Coke Plates—Primes—Per box:			
100-lb., 14x20	6.45	6.10	7.00
Terne Plates—8-lb. Coating—Small lots—Per box:			
IC, 14x20	7.75@8.00	7.00	7.50

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.13	$0.16	$0.15
Cotton waste, colored, per lb.	.09½	.12	.12
Wiping cloths, washed, white, per lb.	.13½	38.00 per M	.16
Sal soda, per lb.	.01½	.02	.02
Roll sulphur, per lb.	.028	.03½	.04
Linseed oil, raw, in 1 to 4 bbl. lots, per lb.	.142	.164	.146
Cutting oil, about 25% lard, in 5 gal. cans, per gal.	.65	.60	.65
Machine oil, medium-bodied (55 gal. steel bbl.) per gal.	.33	.36	.24
Belting—Present discounts from list in fair quantities (½ doz. rolls) for leather or rubber:			
Leather—List price, 24c. per lin.ft., per inch of width, for single ply:			
Medium grade	30–10%	30–10%	35%
Med. grade, heavy wgt	30%	30 –5%	30%
Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft.:			
First grade	50%	50–10%	50%
Second grade	60%	60– 5%	50–10%

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars	per lb.	$0.031	$0.031	$0.0325
Cold fin. shafting	per lb.	.034	.034	.036
Brass rods	per lb.	.1612½	.1612½	.2125
Solder (½ and ½)	per lb.	.245	.245	.3375
Cotton waste, white	per lb.	.13	.13	.10@.13½
Disks, aluminumoxide mineral, cloth, No. 1 6-in. dia.	per 100	4.59	4.59	3.60
Lard cutting oil	per gal.	.65	.65	.75
Machine oil	per gal.	.33	.33	.33
Belting, leather, medium	off list	30–10%	30–10%	30–10%
Machine bolts, up to 1x30 in., full kegs	off list	65%*	50–10%*	50–10%*

*List prices as of April 1, 1927

MISCELLANEOUS—Continued

	New York	Cleveland	Chicago
Abrasive materials — Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets:			
Flint paper*	$6.03	$6.03	$6.03
Emery cloth*	25.87	25.87	25.87
Disks, aluminum oxide mineral, 6 in. dia., No. 1, per 100:			
Paper†	2.61	2.61	2.61
Cloth†	4.59	4.59	4.59
Fire clay, per 100 lb. bag	1.00	.75	.75
Coke, prompt furnace, per net ton	Connellsville, 2.50@2.60		
Coke, prompt foundry, per net ton	Connellsville, 3.50@4.85		
White lead, dry	100 lb. kegs	New York, 13.75	
White lead, in oil	100 lb. kegs	New York, 13.75	
Red lead, dry	100 lb. kegs	New York, 13.75	
Red lead, in oil	100 lb. kegs	New York, 15.25	

*Less than 3 reams. †Less than 200.

SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

Machine bolts:	
Up to ¾-in. x 6-in., full kegs, list less	65%
Larger, up to 1 x 30-in., full kegs, list less	65%
Less than full kegs or case lots, add to list	10%
Fitting-up bolts: list less	45%
Lag screws:	
Up to ½-in. x 6-in., list less	65%
Larger, list less	65%
Less than full keg or case lots, add to list	10%
Rivets:	
Structural, round head, full kegs, net	$4.50
Structural, round head, broken kegs, net	6.00
Tank, 7/16-in. dia. and smaller, list less	65%
Nuts:	
Hot pressed, square or hexagonal, blank or tapped:	
Full kegs up to 1-in., incl., list less	65%
Larger, up to 3-in., list less	65%
Less than keg or case lots, add to list	10%
Washers:	
Wrought, full kegs, per 100 lb., list less	$4.00
Wrought, broken kegs, per 100 lb., list less	2.00
Turnbuckles:	
With stub ends, list less	20–10%
Without stub ends, list less	55%
Chain:	
Proof coil, base, per 100 lb., net	$8.50
Cast iron welding flux, per lb., net	.35
Bronzing flux, per lb., net	.50

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Opportunities for Future Business

Ark., Helena—Allin Machine Shop, plans to rebuild machine shop at Arkansas and Chicasaw Sts. recently destroyed by fire. Loss $30,000.

Calif., Berkeley—University of California, will receive bids about Sept. 1, for the construction of an engineering building at University Campus. Estimated cost $685,000. G. W. Kelham, 315 Montgomery St., San Francisco, Archt. H. J. Brunnier, Sharon Bldg., San Francisco, Engr.

Calif., Los Angeles—E. A. Kassing, awarded contract for the construction of a 7 story, 87 x 166 ft. apartment building and garage at 1745 North Gramercy Pl. Estimated cost $200,000.

Conn., Stamford — Stamford Gas & Electric Co., awarded general contract for the construction of a 3 story, 80 x 112 ft. warehouse and 1 story, 63 x 194 ft. garage at Crosby and Pacific Sts.

Conn., Torrington — Torrington Casting Co., New Litchfield St., awarded contract for a 1 and 2 story brass casting shop. Estimated cost $40,000.

D. C., Washington—Bureau of Yards & Docks, Navy Dept., will soon readvertise for bids for improvements to brass foundry. Former bids rejected.

Fla., Miami—Merrill-Stevens Dry Dock Co., awarded contract for a 30 x 150 ft. addition to plant. Estimated cost $40,000.

Ill., Chicago—Illinois Steel Co., 208 South LaSalle St., will build a 1 story, 149 x 1,674 ft. factory at 8346-61 Mackinaw St. Estimated cost $1,500,000. L. C. B. Holmboe, South Chicago, Archt.

Ill., Chicago — Public Service Co., 72 West Adams St., (electric light manufacturers) awarded contract for the construction of a 2 story, 300 x 326 ft. service headquarters building. Estimated cost $350,000.

Ind., Angola — Gaffill-Oil Co., South Bend, awarded contract for the construction of a machine shop and service station at Martha St., here. Estimated cost $43,000.

Ind., Fort Wayne—DeWald Tire Co., awarded contract for the construction of a 75 x 115 ft. service station at 510 West Jefferson St. Estimated cost $42,000.

Ind., Fort Wayne — General Electric Co., awarded contract for the construction of a 3 story refrigeration factory unit at Winter St. and Wabash Ry. Estimated cost $200,000.

Ind., Indianapolis—J. L. Essex, awarded contract for the construction of a service station at Hosbrook and Shelby Sts. Estimated cost $40,000.

Ia., Columbus Junction—R. A. Frink, Maintenance Supt., Washington, will receive bids until Aug. 29, for the construction of a maintenance garage, here.

Md., Baltimore — Stewart & Co., Lexington and Howard Sts., will not construct 1 story, 168 x 202 ft. warehouse and garage at Josephine and Pine Sts. Project in abeyance. Noted July 31.

Mass., Brighton—Commonwealth Garage, 100 Brighton Ave., awarded contract for the construction of a 1 story service station and repair shop at Brighton Ave. and Linden. Estimated cost $40,000.

Mass., Jamaica Plain (Boston P.O.)—R. C. Victor Co. of Massachusetts, 76 Atherton St., awarded contract for a 4 story, 60 x 242 ft. addition to factory.

Mass., Lynn—City awarded contract for the construction of a police station, garage, etc. Estimated cost $200,000.

Mont., Glendive—Northern Pacific Ry. Co., St. Paul, Minn., awarded contracts for construction of a round house and machine shop, here. Estimated cost $42,000 and $30,000 respectively. B. Blum, Ch. Engr.

Mo., Jefferson City—State Highway Commission, awarded contract for the construction of a garage and storage building. Noted Aug. 7.

Mo., St. Louis—Bd. of Education, 911 Locust St., will receive bids until Sept. 3, for the construction of a 4 story, 101 x 150 ft. shop building, etc. Estimated cost $245,000. G. W. Sanger, Acting Comr. of Buildings. Noted May 29.

N. J., Bound Brook — G. A. Just Co., 395 Lexington Ave., New York, N. Y., plans the construction of a steel fabrication plant. Estimated cost $40,000. Architect not selected.

N. J., Camden — Continental Car Co., c/o Francesco & Jacobus, 511 5th Ave., New York, N. Y., Archts., plans the construction of a 5 or 7 story, 129 x 339 ft. factory at Arch and Second Sts., here.

N. J., Harrison—Driver-Harris Co., Middlesex St., will receive bids about Oct. 15, for the construction of a 1 and 2 story addition to factory. Estimated cost $250,000. J. A. Finegan, 776 Broad St., Newark, Archt. Noted Aug. 14.

N. J., Jersey City — Jersey City Ladder Co., Inc., 677 Montgomery St., will not construct 2 story, 45 x 140 ft. factory on Crawford St. $40,000. B. Singer, 921 Bergen Ave., Archt. Project in abeyance. Noted July 10.

N. J., Newark — Bd. of Education, City Hall Annex, plans the construction of a repair department building. Estimated cost $150,000. Architect not announced.

O., Cleveland—Cleveland Steel Products Co., 7300 Madison Ave., manufacturers of oil burners, had plans prepared for the construction of a 1 story, 78 x 90 ft. factory. Estimated cost $40,000. G. S. Rider Co., Marshall Bldg., Archt.

Okla., Boise City—Atchison, Topeka & Santa Fe Ry. Co., Amarillo, Tex., acquired a site and plans the construction of a round house, mechanical shops, etc., here. W. W. Kelly, Amarillo, Ch. Engr. Western Lines.

Pa., Johnstown — Bethlehem Steel Co., is having plans prepared for the construction of two stock houses and blast furnace including two double hopper scale cars. Estimated cost $600,000. A. G. McKee Co., 2422 Euclid Ave., Cleveland, O., Engr.

Pa., McKeesport — Bd. of Education, J. B. Richey, Supt., Ariel Bldg., plans the construction of a trade high school on Cornell St. Estimated cost $600,000. C. R. Moffett, Masonic Temple Bldg., Archt. Noted Mar. 3.

Pa., Pittsburgh—National Valve & Mfg. Co., H. Haller, Pres., 3101 Liberty Ave., awarded contract for a 1 story, 48 x 100 ft. addition to shop. Noted Aug. 14.

Wyo., Cheyenne — Union Pacific R.R., 15th and Dodge Sts., Omaha, Neb., plans the construction of a new freight classification yard to include car repair facilities, here. G. J. Adamson, Omaha, Ch. Engr.

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